Dairy Cost Study

The Economics of Milk Production in Alberta 2002

LEGISLATURE LIBRARY
AUG – 8 2003
EDMONTON

Alberta
AGRICULTURE, FOOD AND RURAL DEVELOPMENT

Economics & Competitiveness

AGDEX – 821-1

July, 2003

THE DAIRY COST STUDY:

ECONOMICS OF MILK PRODUCTION

IN ALBERTA

2002

Volume 62

by

Richard Heikkila

Pauline Van Biert

Economics Unit

Economics and Competitiveness Division

Alberta Agriculture, Food & Rural Development

Foreword

This report was prepared from the farm records of 59 milk producers in Alberta who volunteered for the 2002 Dairy Cost Study. Their participation was encouraged by Alberta Milk which provided financial compensation to participants. The Economics Unit, as well as fellow producers, are most appreciative of the time and effort they gave in providing timely and accurate information.

Questions or comments regarding this study, formula pricing, or other related issues should be directed to:

Richard Heikkila
Senior Economic Analyst
Economics Unit, AAFRD
Phone: (780) 422-4088
e-mail: richard.heikkila@gov.ab.ca

Pauline Van Biert
Research Assistant
Economics Unit, AAFRD
Phone: (780) 415-2153
e-mail: pauline.vanbiert@gov.ab.ca

Table of Contents

Foreword i

Introduction 1

The Dairy Cost Study 2

The Survey Group 2

Study Methodology 3

Dairy Enterprise Economic Overview 5

Definitions for the Dairy Cost Study 9

Production Factor Analysis 10

- Herd Size 11
- Milk Production 12
- Gross Income 13
- Total Cost 14
- Investment 15
- Return to Equity 16

Detailed Management Factors, Northern and Southern Alberta 17

Historical Economic Trends 18

Dairy Enterprise Investment and Debt Levels 20

Debt Repayment Capacity 21

Impact of Quota Value on Dairy Returns 24

Appendix

A	Average Dairy Farm Summary, Alberta	27
B	Average Dairy Farm Summary, Northern Alberta	33
C	Average Dairy Farm Summary, Southern Alberta	39
D	Charts Showing Individual Results for Dairy Study Participants	45
E	Monthly/Annual Questionnaires	53
F	Alberta Fluid Milk Price Formula	59

Introduction

The fluid milk price received by dairy producers in Alberta is regulated by the Alberta Energy and Utilities Board (AEUB). The Economics Unit conducts an annual study of dairy production costs and returns in Alberta to assist the AEUB in administering fluid milk prices. Introduced during World War II, this annual "Dairy Cost Study" is recognized by dairy farmers, consumers and the AEUB as a reliable reference for setting fluid milk prices.

In addition to the Dairy Cost Study, the Economics Unit is also responsible for the fluid milk price indexing formula, a computer model that provides an estimate of changes in monthly producer costs (Appendix F). This model enables the AEUB to make more frequent adjustments to the producer price in response to changes in production costs during the year. At the end of each year, the performance of formula pricing is evaluated and compared to the Dairy Cost Study. If warranted, further adjustments to the producer price can then be made.

Specifically the objectives of the study are as follows:

- to provide a continuing account of the costs and returns of fluid milk production in Alberta;
- to annually monitor the performance of the fluid milk pricing formula;
- to use the findings as a basis for revising the formula price;
- to provide the participating dairy farmers with a personal business analysis for management purposes; and
- to provide economic information for farm management and extension education.

This costs and returns account is a vital economic indicator for pricing fluid milk in Alberta because the industry is under a system of supply management.

The Dairy Cost Study

The Dairy Cost Study is an analysis of the costs and returns of a sample of Alberta dairy producers for a given production year. Study participants are required to complete a monthly questionnaire of their dairy production activities - dairy herd inventory, capital purchases, milk sales and farm use, feed use and purchase costs, labour costs, and other expenses related to the dairy enterprise - and an annual questionnaire of their dairy investment. (The questionnaires are shown in Appendix E.) From this database, weighted sample averages are calculated which represent benchmarks for all dairy producers in the province. As well, study participants receive a confidential report on their dairy operation which can be compared with these provincial benchmarks.

As the analysis is based on monthly survey data collected from milk producers, the results indicate the cost of producing both fluid and industrial milk. However, the cost of producing only industrial milk should not be significantly different. In 2002, approximately 55.9 percent of Alberta's total milk production went into fluid milk, with the remainder going to industrial uses. Moreover, since 1988 the quality of fluid and industrial milk in Alberta has become almost indistinguishable.

The Survey Group

Fifty-nine dairy producers across the province submitted monthly business information for the 2002 calendar year. Two regional sub-groups were also identified for Northern Alberta (north of Ponoka) and Southern Alberta. Northern Alberta was represented by 27 producers while Southern Alberta had 32 producers in the study.

The study was designed to represent a cross section of dairy farms by the size of their milk quota. Efforts were made to select study participants by systematic random sampling to provide better representation of the total population. Some characteristics of the sample are shown in Table 1. Appendix D presents charts showing individual results for the 59 dairy study participants.

Table 1

2002 Sample Characteristics

Years in Dairy	Total Sample	Indebtedness		Herd Size (# of cows)	
	%	<30%	≥30%	<50	≥50
<10	20	0	12	1	11
≥10	80	23	24	9	38
Total (%)	**100**	**39**	**61**	**17**	**83**

Study Methodology

1. **Enterprise identification:** There are several different approaches for calculating the farm cost of producing fluid milk. Some studies use the total farm approach, which combines the dairy costs with those of other enterprises. This Alberta study examines only the dairy enterprise, which is defined as all activities associated with both milking cows and maintaining dry cows and young dairy stock. In most cases, the dairy operator uses home-grown feed, either entirely or in association with purchased feed. The costs of production of the homegrown feed are allocated to the crop enterprise portion of the farm, and are not considered in the dairy enterprise. Consequently, the final costs outlined in this report are only those associated with milk production.

2. **Inventory adjustment:** Since the cost of raising young dairy stock is included in the cost of milk production, the total income includes net cattle sales and net inventory changes. Cattle inventory changes, or herd growth, are determined by subtracting the beginning-year inventory value from the year-end inventory value. Gross income is thus composed of milk sales, net cattle sales, and the value of this net inventory adjustment. The net inventory adjustment may be negative or positive.

3. **Home grown feed:** Hay that is grown on the farm and fed to dairy livestock is priced at the regional market value of stacked hay on the farm. Similarly, feed grain is valued at regional elevator prices provided by the Alberta Grain Commission. In other words, the dairy enterprise is charged the current market value for these home-grown inputs, just as if they were purchased from the cropping enterprise. The total value of home-grown feed is determined by multiplying the regional value or price by the actual quantity fed. This procedure adequately compensates for the production cost of home-grown feed. Alternatively, where feed is purchased, the actual purchase cost is used in the analysis.

4. **Value of investment and depreciation:** The information presented in this report is intended to reflect the average yearly production conditions in the dairy industry. Depreciation estimates are based on the original value of buildings and machinery. Current market value of owned assets is also estimated by updating the original value of the dairy investment with appropriate inflation factors, and then depreciating each item accordingly, based on the number of years in use. Original values and years in use are obtained from participants' farm records. With the exception of acreage for pasture, house, dairy buildings and corral location, farmland is not considered to be a dairy investment. The dairy livestock inventory is valued at the prevailing market prices at the beginning of the year. Value of investment is used for calculating the return to equity, and for determining the equity position of the dairy operation.

5. **Operator and family labour:** The operator's actual labour may vary from almost nil on some dairy farms to the total input of labour on other farms. The procedure used in this study to put a value to operator labour is to multiply the operator's labour hours times the average hourly wage rate paid for full time dairy labour (including room and board). This method is preferred over leaving unpaid labour as a residual because of the great variability in labour time between operators. Family labour is evaluated similar to the above, but a lower wage rate is applied to family members under the age of 16. Partners, spouses and other family members (16 years of age or older) receive the same wage rate as the operator.

6. **Interest on capital:** The actual interest paid on existing liabilities is included in the capital cost. To obtain this value, participating producers were asked to report their outstanding liabilities and the interest rates charged. This method is more accurate than reporting the total annual interest paid. When both the total variable cost and the capital cost for the dairy enterprise are subtracted from gross income, the bottom line residual is the return to equity and management. When this residual is expressed as a percentage of the equity capital, then the percent return to equity can be compared with the returns from alternative investment opportunities such as Canada Savings Bonds or term deposits.

7. **Rent:** Rent charges are included in the cost of capital. The capital cost in this context represents the cost of ownership of resources. If resources are rented, there is a charge for their use. If, on the other hand, resources are owned, the owner must bear the cost of depreciation and interest on debt.

Dairy Enterprise Economic Overview

Tables 2 through 4 provide a summary of the costs and returns for dairy producers in Alberta. (Definitions of terms listed in the tables are provided on page nine. More detailed results are presented in Appendices A, B, and C.) In Table 2, the average results for the entire survey sample are listed in the centre column. As well, costs and returns are provided for two sub-groups of dairy producers based on their total production costs, namely the bottom 1/3 and the top 1/3. The bottom 1/3 are the highest cost producers and the top 1/3 the lowest cost producers. The top 1/3 group's total costs were 31% lower than the bottom 1/3, but its revenues were also lower by 9%.

Table 3 compares the average costs and returns for 2001 and 2002. In 2002, total costs were higher than in 2001, primarily due to higher labour and feed costs.

Finally, Table 4 compares average costs and returns for Northern and Southern Alberta.

Table 2

Dairy Enterprise Costs and Returns - $ Per hL Sold

Bottom 1/3 (Highest Cost Producers), Average Cost, Top 1/3 (Lowest Cost Producers)

	Bottom 1/3	Average	Top 1/3
Milk Sales	63.04	60.30	59.63
Gross Income	**68.16**	**63.16**	**61.72**
Feed Cost	24.67	21.75	18.86
Main Feed Components:			
Grain	3.57	2.98	2.85
Complete Feed	7.87	7.71	6.08
Roughage	11.08	8.84	7.80
Labour Costs	15.04	9.54	8.62
Other Variable Costs	17.06	14.35	12.62
Depreciation	8.24	6.22	5.13
Other Capital Costs	4.57	4.19	2.94
Total Production Costs	**70.18**	**56.04**	**48.18**
Total Cash Costs	48.73	43.40	37.51
Gross Margin	**19.43**	**19.76**	**24.21**
Contribution Margin	**10.79**	**17.52**	**21.62**
Return to Investment	**.64**	**9.90**	**15.38**
Return to Equity & Management	**-2.02**	**7.12**	**13.54**
Return to Investment (%)	**1.2**	**8.2**	**16.1**
Return to Equity & Management (%)	**.44**	**9.3**	**29.4**

Figure 1 - 2002 Dairy Production Costs
$ per hL

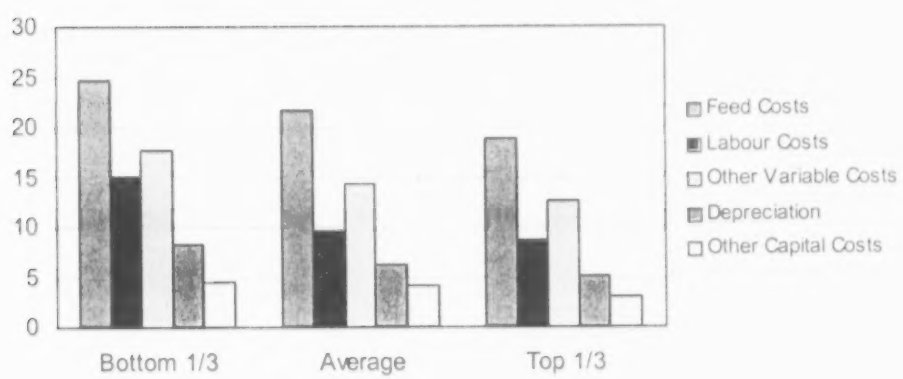


Table 3

Dairy Enterprise Costs and Returns - $ Per hL Sold

2001 and 2002

	2001 (62 producers)	2002 (59 producers)
Milk Sales	54.47	60.30
Gross Income	**60.61**	**63.16**
Feed Costs	20.27	21.75
Main Feed Components:		
Grain	2.80	2.98
Complete Feed	6.70	7.71
Roughage	7.69	8.84
Labour Costs	8.89	9.54
Other Variable Costs	14.21	14.35
Depreciation	5.79	6.22
Other Capital Costs	3.58	4.19
Total Production Costs	**52.73**	**56.04**
Total Cash Costs	41.21	43.40
Gross Margin	**19.40**	**19.76**
Contribution Margin	**17.24**	**17.52**
Return to Investment	**11.00**	**9.90**
Return to Equity & Management	**7.88**	**7.12**
Return to Investment (%)	**9.7**	**8.2**
Return to Equity & Management (%)	**11.4**	**9.3**

Figure 2 - Dairy Production Costs - 2001 and 2002
$ per hL

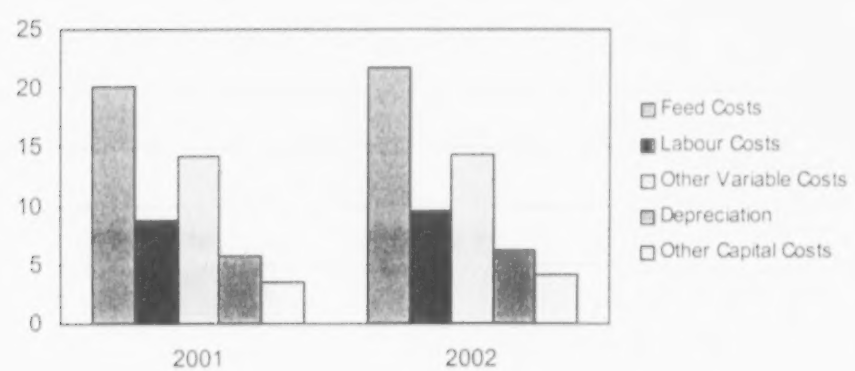


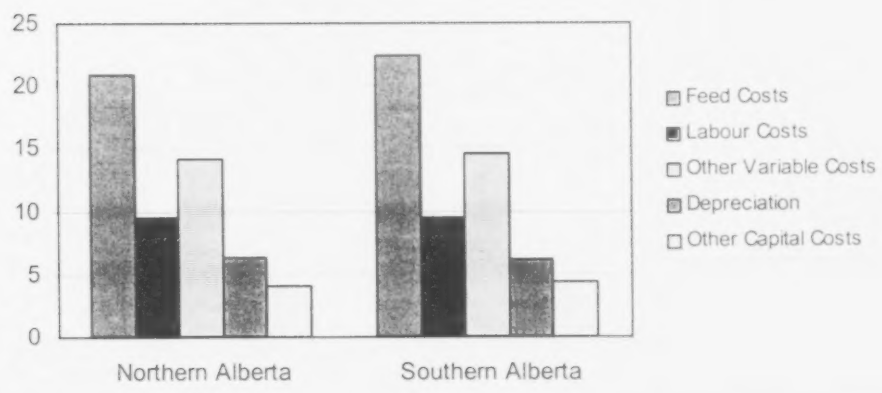
Table 4

Average Dairy Enterprise Costs and Returns - $ Per hL Sold

Northern and Southern Alberta

	Northern Alberta (27 Producers)	Southern Alberta (32 Producers)
Milk Sales	60.74	59.91
Gross Income	**63.18**	**63.13**
Feed Costs	20.96	22.45
Main Feed Components:		
Grain	3.65	2.39
Complete Feed	6.66	8.63
Roughage	8.41	9.21
Labour Cost	9.56	9.52
Other Variable Costs	14.10	14.57
Depreciation	6.33	6.12
Other Capital Costs	4.02	4.34
Total Production Costs	**54.96**	**56.99**
Total Cash Costs	42.36	44.32
Gross Margin	**20.82**	**18.82**
Contribution Margin	**18.56**	**16.60**
Return to Investment	**10.73**	**9.16**
Return to Equity & Management	**8.22**	**6.14**
Return to Investment (%)	**8.9**	**7.5**
Return to Equity & Management (%)	**10.2**	**8.4**

Figure 3 - Regional Dairy Production Costs
$ per hL



Definitions for the Dairy Cost Study

Net Cattle Sales - revenues associated with the sale of dairy livestock (milking / dry cows, replacement heifers, bulls and young stock)

Gross Income - the value of what was produced by the dairy enterprise over the course of the production year. Includes cash and non-cash values of:

- milk sales,
- revenues from miscellaneous sources (eg. milk subsidies, pool adjustments),
- inventory adjustments relating changes in the number & value of stock included in the enterprise,
- net cattle sales

Feed Costs - the cost of all feeds used by the dairy enterprise, purchased or homegrown, based on the market value of these feeds (**not** the cost of raising the feeds).

Labour Costs - a sum of paid and contributed labour, as allocated to the dairy enterprise. Paid labour is valued at cost, while unpaid labour is valued at a standard or base cost.

Other Variable Costs - total variable costs (such as bedding and supplies, vet and medicine, utilities, fuel, repairs) less feed and labour costs.

Depreciation - sum of depreciation and machinery/equipment/building lease payments on assets allocated to the dairy enterprise.

Other Capital Costs - total cash overheads, as allocated to the dairy enterprise (property taxes, insurances, licences and term loan interest).

Total Cash Costs - total production costs less depreciation and family labour.

Total Production Costs - sum of all variable and capital production costs.

Contracted Export Milk (CEM) - the cost is the sum of total feed costs and total other variable costs less milk hauling cost, producers' fees, and taxes and insurance.

Contribution Margin - gross income less variable costs

Gross Margin - gross income less total cash costs

Return to Investment ($) - gross income less total production costs plus term (capital) interest paid

Return to Equity & Management ($) - gross income less total production costs

Investment - sum of assets allocated to the enterprise. Includes: dairy livestock, machinery, equipment, buildings/facilities and building site.

Median - the value of the middle item of a data set that has been arranged in an increasing order (lowest to highest).

Production Factor Analysis

This section provides a detailed analysis of the survey group based on six specific production factors:

- herd size
- milk production
- gross income
- total cost
- investment
- return to equity

For each analysis, the survey group is sorted into three separate classes (bottom 1/3, middle 1/3, top 1/3) based on the production factor being evaluated. For instance, on the next page the survey group has been divided into three sub-groups based on herd size. The bottom 1/3 group consists of the smallest dairy enterprises while the top 1/3 group consists of the largest producers. Production and management results are shown for each sub-group in the accompanying table and figures.

Dairy Characteristics by Herd Size Class

Herd Sizes ranged from 31 to 499 milking cows. For this analysis, the sample group was split into the following three size classes:

Bottom 1/3	31 - 59
Middle 1/3	60 - 95
Top 1/3	97 - 499

Table 5 - Dairy Enterprise Characteristics by Herd Size Class

	Bottom 1/3 31 - 59	Middle 1/3 60 - 95	Top 1/3 97 - 499
Years in Dairy	18.60	20.89	20.88
Milk Production (litres/yr)	**9,307.15**	**9,238.73**	**9,479.45**
Home Grown Feed (%)	68.38	84.28	72.70
Butterfat Test (%)	3.62	3.57	3.56
Gross Income ($/hL)	65.95	62.93	63.19
Total Costs ($/hL)	**65.27**	**59.82**	**52.46**
Feed Costs ($/hL)	22.86	21.87	21.20
Labour (hrs/cow)	81.07	66.84	50.92
Investment ($/cow)	12,955.80	10,386.19	10,518.63
Return to Equity (%)	1.98	14.69	18.00
Return to Investment (%)	1.23	4.84	10.33
Debt/Capital Ratio	0.28	0.42	0.34

Figures 4 and 5 illustrate Milk Production and Total Costs results for the bottom, middle and top 1/3 groups (sorted by Herd Size Class).

Figure 4 - Milk Production
(2002)

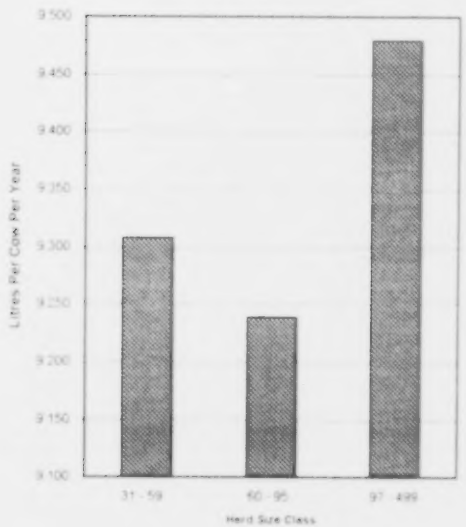
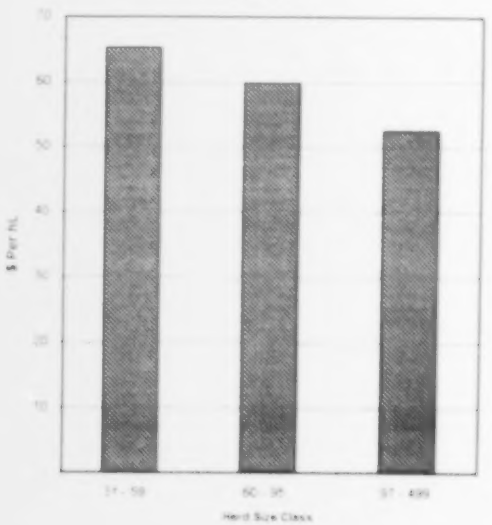


Figure 5 - Total Costs
(2002)



Dairy Characteristics by Milk Production Class

Milk Production ranged between 6236 and 11,965 litres per cow per year. For this analysis, the sample group was split into the following three classes:

Bottom 1/3	6236 - 8548
Middle 1/3	8565 - 9998
Top 1/3	10,031 - 11,965

Table 6 - Dairy Enterprise by Milk Production Class

	Bottom 1/3 6236 - 8548	Middle 1/3 8565 - 9998	Top 1/3 10,031 - 11,965
Years in Dairy	25.30	18.47	16.48
Herd Size	69.66	128.90	85.05
Home Grown Feed (%)	85.84	54.33	83.69
Butterfat Test (%)	**3.69**	**3.59**	**3.47**
Gross Income ($/hL)	67.09	63.70	61.33
Total Costs ($/hL)	66.07	58.10	53.30
Feed Costs ($/hL)	**23.81**	**22.76**	**19.39**
Labour (hrs/cow)	71.10	60.97	66.46
Investment ($/cow)	11,303.88	11,085.49	11,506.22
Return to Equity (%)	4.76	13.41	16.43
Return to Investment (%)	2.10	5.91	8.44
Debt/Capital Ratio	0.25	0.40	0.38

Figures 6 and 7 illustrate Butterfat Test and Feed Costs results for the bottom, middle and top 1/3 groups (sorted by Milk Production Class).

Figure 6 - Butterfat Test
(2002)

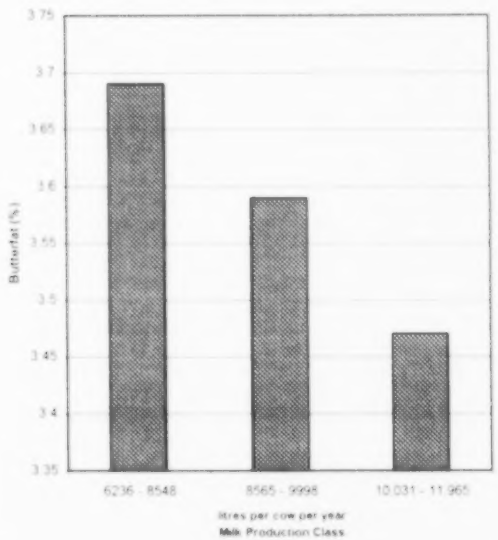
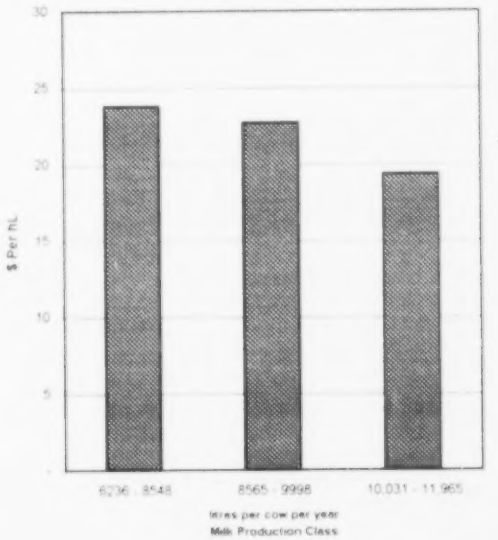


Figure 7 - Feed Costs
(2002)



Dairy Characteristics by Gross Income Class

Gross Income ranged between $51.71 and $81.28 per hL sold. For this analysis, the sample group was split into the following three classes:

Bottom 1/3	51.71 - 61.39
Middle 1/3	61.55 - 64.95
Top 1/3	65.62 - 81.28

Table 7 - Dairy Enterprise by Gross Income Class

	Bottom 1/3 51.71 - 61.39	Middle 1/3 61.55 - 64.95	Top 1/3 65.62 - 81.28
Years in Dairy	**19.10**	**17.76**	**23.35**
Herd Size	98.79	109.87	74.00
Milk Production (litres/yr)	9,941.63	9,498.37	8,598.31
Home Grown Feed (%)	80.74	59.05	84.30
Butterfat Test (%)	3.48	3.61	3.66
Total Costs ($/hL)	54.24	57.31	65.88
Feed Costs($/hL)	20.48	22.27	23.20
Labour (hrs/cow)	**66.53**	**59.21**	**72.71**
Investment ($/cow)	11,497.87	10,683.43	11,694.19
Return to Equity (%)	10.98	15.90	7.85
Return to Investment (%)	5.24	6.64	4.61
Debt/Capital Ratio	0.35	0.39	0.29

Figures 8 and 9 illustrate Years in Dairy and Labour results for the bottom, middle and top 1/3 groups (sorted by Gross Income Class).

Figure 8 - Years in Dairy
(2002)

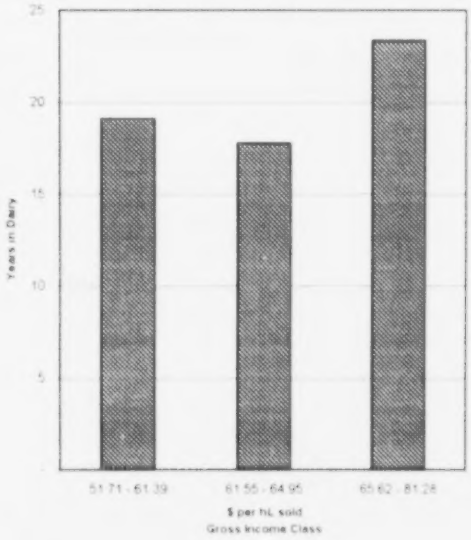
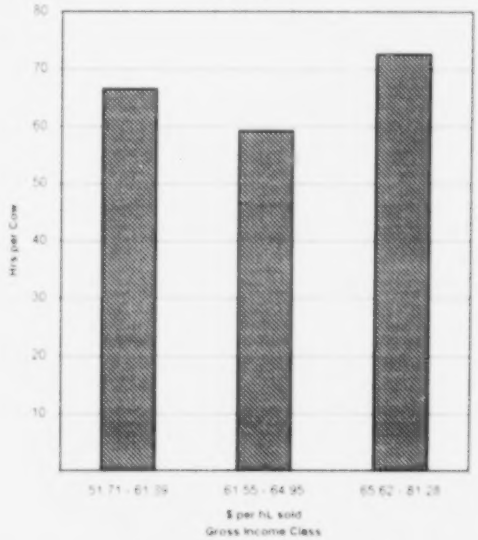


Figure 9 - Labour (hrs/cow)
(2002)



Dairy Characteristics by Total Cost Class

Total Cost ranged between $43.87 and $82.46 per hL sold. For this analysis, the sample group was split into the following three classes:

Top 1/3	43.87 - 53.65
Middle 1/3	54.62 - 63.39
Bottom 1/3	63.46 - 82.46

Table 8 - Dairy Enterprise by Total Cost Class

	Top 1/3 43.87 - 53.65	Middle 1/3 54.62 - 63.39	Bottom 1/3 63.46 - 82.46
Years in Dairy	20.43	15.79	23.90
Herd Size	120.69	104.60	57.11
Milk Production (litres/yr)	**9,938.04**	**9,673.99**	**8,435.06**
Home Grown Feed (%)	81.51	71.21	71.98
Butterfat Test (%)	3.49	3.55	3.71
Gross Income ($/hL)	61.72	62.15	68.16
Feed Costs ($/hL)	18.86	22.42	24.67
Labour (hrs/cow)	55.67	62.55	80.39
Investment ($/cow)	9,667.79	11,622.41	12,632.23
Return to Equity (%)	**29.35**	**5.29**	**(0.44)**
Return to Investment (%)	14.12	2.76	(0.59)
Debt/Capital Ratio	0.32	0.44	0.27

Figures 10 and 11 illustrate Milk Production and Return to Equity results for the top, middle and bottom 1/3 groups (sorted by Total Cost Class).

Figure 10 - Milk Production
(2002)

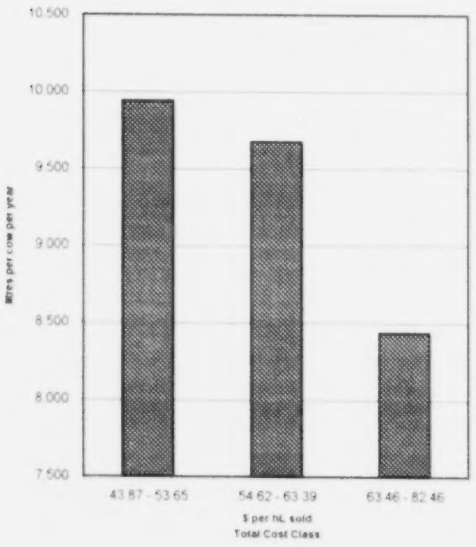
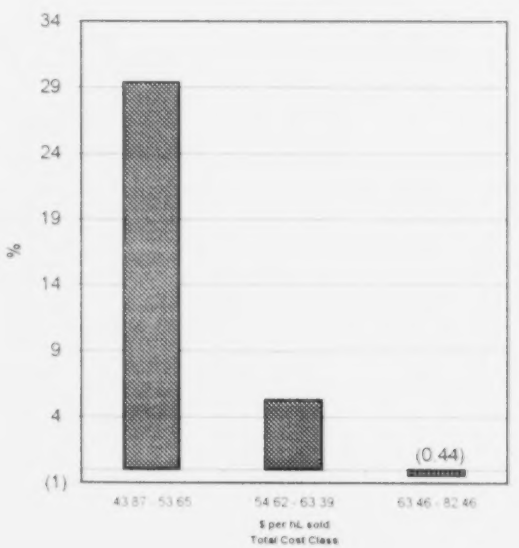


Figure 11 - Return to Equity (%)
(2002)



Dairy Characteristics by Investment Class

Investment per cow ranged between $5564 and $20,044. For this analysis, the sample group was split into the following three classes:

Bottom 1/3	5564 - 10,201
Middle 1/3	10,230 - 12,253
Top 1/3	12,762 - 20,044

Table 9 - Dairy Enterprise by Investment Class

	Bottom 1/3 5564 - 10,201	Middle 1/3 10,230 - 12,253	Top 1/3 12,762 - 20,044
Years in Dairy	20.63	20.42	19.30
Herd Size	96.24	106.60	79.65
Milk Production (litres/yr)	9,065.88	9,728.50	9,255.40
Home Grown Feed (%)	79.65	75.01	70.24
Butterfat Test (%)	3.56	3.57	3.62
Gross Income ($/hL)	64.88	64.05	63.19
Total Costs ($/hL)	54.68	58.12	64.67
Feed Costs ($/hL)	22.09	22.01	21.83
Labour (hrs/cow)	**61.02**	**65.08**	**72.64**
Return to Equity (%)	**26.04**	**8.24**	**0.07**
Return to Investment (%)	11.34	5.50	(0.41)
Debt/Capital Ratio	0.37	0.29	0.37

Figures 12 and 13 illustrate Labour and Return to Equity results for the bottom, middle and top 1/3 groups (sorted by Investment Class)

Figure 12 -Labour (hrs/cow)
(2002)

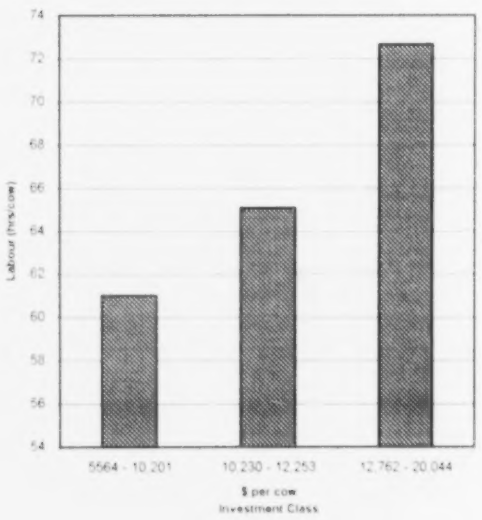
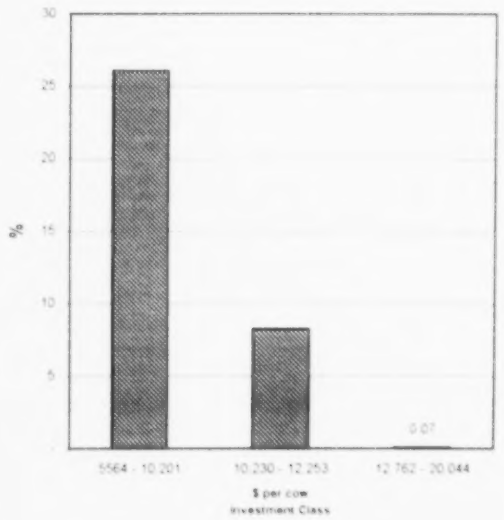


Figure 13 - Return to Equity (%)
(2002)



Dairy Characteristics by Return to Equity Class

Return to Equity ranged between -24.91% and 80.82%. For this analysis, the sample group was split into the following three classes:

Bottom 1/3	(24.91) - 0.86
Middle 1/3	1.88 - 12.86
Top 1/3	14.22 - 80.82

Table 10 - Dairy Enterprise by Return to Equity Class

	Bottom 1/3 (24.91) - 0.86	Middle 1/3 1.88 - 12.86	Top 1/3 14.22 - 80.82
Years in Dairy	20.40	21.37	18.63
Herd Size	64.14	94.52	123.23
Milk Production (litres/yr)	8,900.24	9,452.39	9,683.38
Home Grown Feed (%)	60.80	82.46	82.01
Butterfat Test (%)	3.64	3.57	3.54
Gross Income ($/hL)	**63.92**	**65.17**	**63.09**
Total Costs ($/hL)	**68.75**	**58.07**	**50.64**
Feed Costs ($/hL)	24.71	20.88	20.28
Labour (hrs/cow)	76.94	69.56	52.47
Investment ($/cow)	13,652.33	10,942.16	9,293.93
Return to Investment (%)	(2.79)	6.00	13.25
Debt/Capital Ratio	0.31	0.25	0.47

Figures 14 and 15 illustrate Gross Income and Total Costs results for the bottom, middle and top 1/3 groups (sorted by Return to Equity Class).

Figure 14 - Gross Income
(2002)

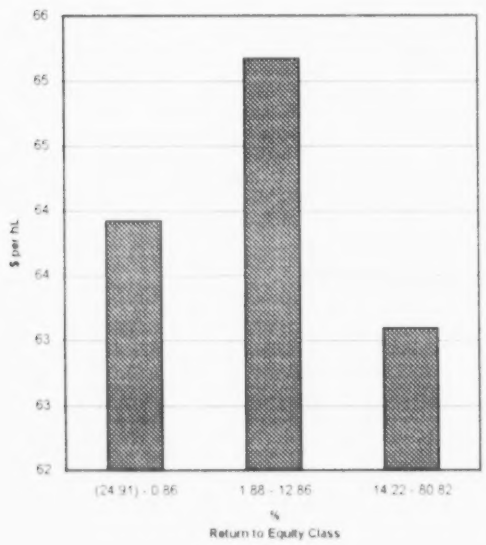
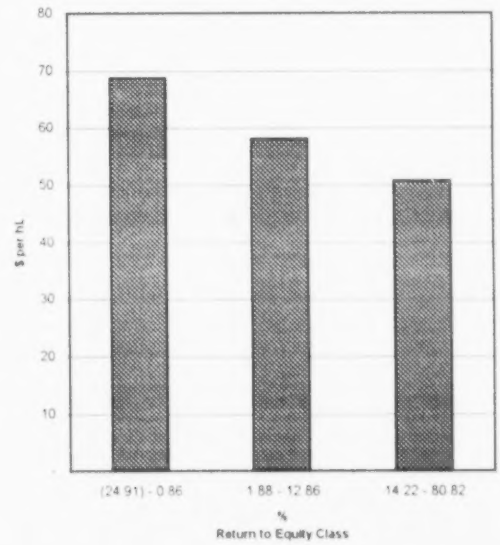


Figure 15 - Total Costs
(2002)



Detailed Management Factors, Northern and Southern Alberta

Table 11 provides a further examination of regional differences from a management perspective.

Table 11

Detailed Management Factors, Northern and Southern Alberta, 2002

	Northern Alberta	Southern Alberta
Herd Size	96.69	91.65
Milk Production (litres/cow/year)	9,293.01	9,454.32
Feed Conversion (litres/kg)	2.09	2.11
Labour Productivity (litres/hr)	159.27	161.91
Labour Hours/Cow(hrs)	58.35	58.39
Investment/Cow ($/cow)	10,872.59	11,096.60
Milk Production/$ Invest (litres/$)	0.85	0.85
Feed Costs ($/cow)	1,893.20	2,045.04
Purchased Barley ($/tonne)	150.61	146.42
Cost of Purchased Alfalfa Hay ($/tonne)	161.55	175.48
Use of Home Grown Roughage (%)	61.93	77.82
Butterfat Test (kg/hL)	3.59	3.58
Protein (kg/hL)	3.26	3.25
LOS (kg/hL)	5.60	5.57
Total Costs ($/hL)	54.96	56.99
Contracted Export Milk Costs ($/hL)	31.82	33.69
Contribution Margin ($/hL)	18.56	16.60
Return to Investment (%)	8.9	7.5
Return to Equity ($/hL)	8.22	6.14
Return to Equity (%)	10.2	8.4
Debt to Asset Ratio (%)	0.33	0.40

Historical Economic Trends

Figure 16 - Average Milk Price
($ per hL)

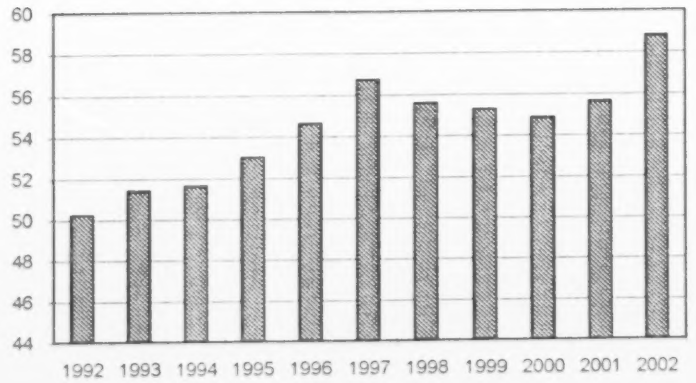


Figure 17 - Feed Cost
($ per hL)

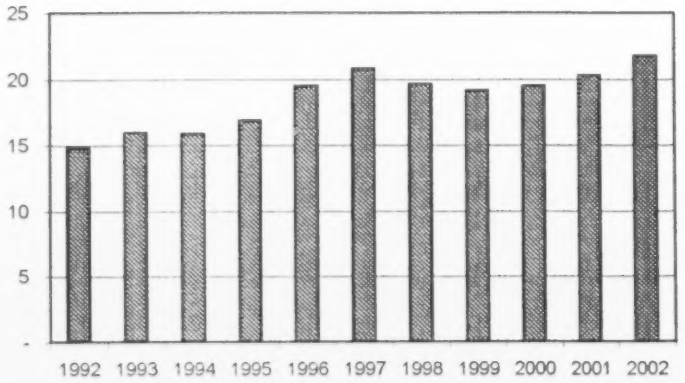


Figure 18 - Total Cost
($ per hL)

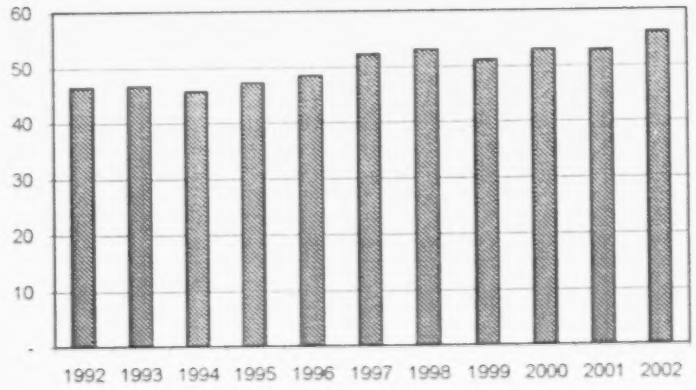


Figure 19 - Return to Equity
(%)

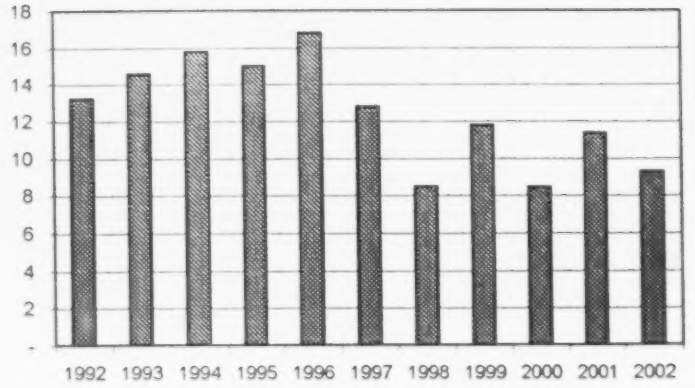


Figure 20 - Median Size of Dairy Herd

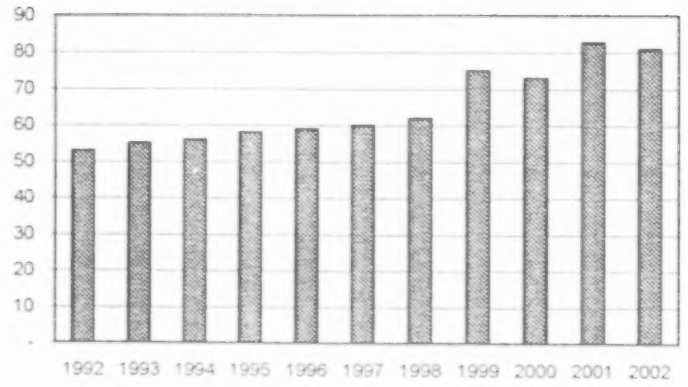


Figure 21 - Milk Production
(litres per year)

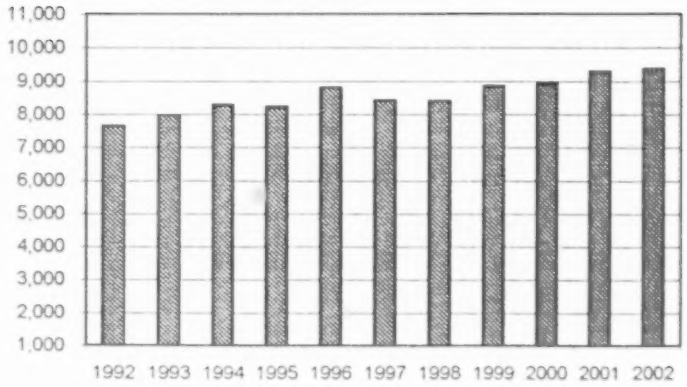


Figure 22 - Purchased Barley Cost
($ per tonne)

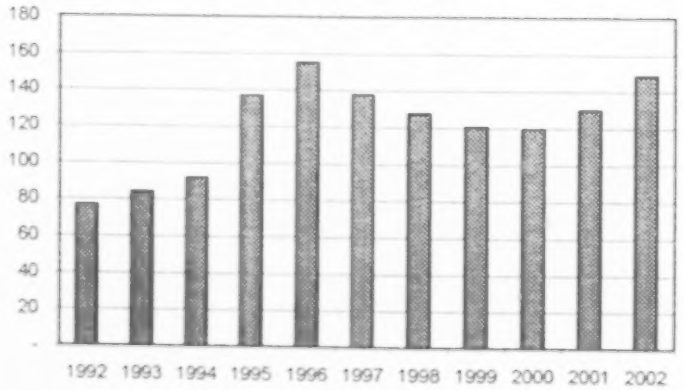
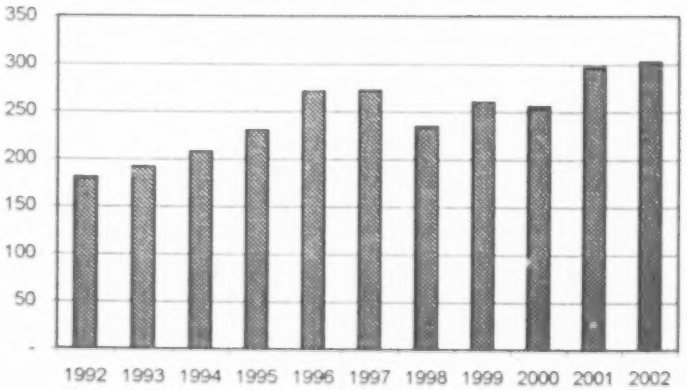


Figure 23 - Cost of Dairy Ration
($ per tonne)



Dairy Enterprise Investment and Debt Levels

Total dairy farm investment (excluding quota) rose only slightly to $1,032,617 per farm in 2002, compared to an average of $1,028,577 in 2001. Of this total amount, 68.2 percent was comprised of buildings and equipment investment, 26.4 percent referred to livestock investment, and the remaining 5.4 percent was invested in land and supplies. On a per cow basis, this worked out to $10,991 in 2002, a 7.7 percent increase from 2001 (Table 12).

Table 12

Annual Investment and Debt on Dairy Farms

	2000	2001	2002
	--- $ Per Cow ---		
Land	587	587	435
Buildings and Equipment	6,447	6,999	7,494
Livestock	2,244	2,490	2,899
Supplies	119	131	163
TOTAL	**9,397**	**10,207**	**10,991**
Debt	3,555	3,972	4,048
Equity	5,842	6,235	6,943
TOTAL	**9,397**	**10,207**	**10,991**

The debt/capital ratio decreased marginally to 37 per cent in 2002. For the past four years it has been fairly constant, ranging between 36 and 39 per cent. This ratio measures the extent of external financing on dairy farms in Alberta.

Debt Repayment Capacity

The acceptable debt load or repayment capacity of a dairy enterprise can be measured by the contribution margin. Contribution margin is the difference between gross income and variable costs. Therefore, it represents the amount of money available to pay for capital assets - rent, mortgage payments (principle and interest), and taxes. The amount of cash remaining after capital assets payments is the producer's return to owner equity, or profit. A summary of contribution margins for the dairy years 2000, 2001, and 2002 is presented in Table 13.

Table 13

Summary of Average Costs and Returns in Alberta

2000 - 2002

	2000	2001	2002	2000-2002
		------ $ Per Cow ------		
A. Gross Income	5,075	5,462	5,731	5,423
B. Feed Costs	1,690	1,827	1,974	1,830
C. Variable Costs	2,102	2,081	2,168	2,117
Contribution Margin (A - B - C)	1,283	1,554	1,589	1,475

The contribution margin can be used to determine the amount of debt load that a farm enterprise can carry. Table 14 shows the total debt load that a farm enterprise can carry on a per cow basis at various interest rates and various cow productivity levels. It is based on the average costs and returns between 2000 and 2002. The assumptions behind the analysis are that feed costs vary directly with the level of production, while other operating costs such as labour, maintenance, and repairs remain relatively unchanged at the three-year average of $2,117 per cow.

Table 14

Acceptable Total Debt-Load per Cow in Alberta, 2000-2002*

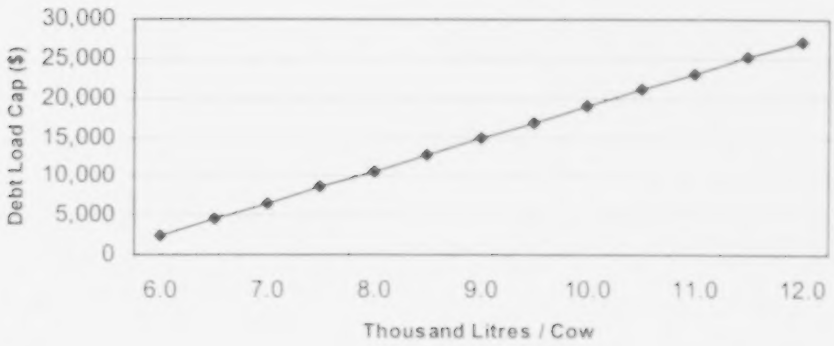
Milk Productivity (litres/cow)	Interest Rates 5%	6%	7%	8%	9%	10%
6,000	2,822	2,597	2,399	2,223	2,067	1,928
6,500	5,256	4,837	4,468	4,141	3,850	3,590
7,000	7,690	7,077	6,537	6,058	5,633	5,253
7,500	10,123	9,317	8,606	7,976	7,415	6,916
8,000	12,557	11,557	10,675	9,893	9,198	8,578
8,500	14,991	13,797	12,744	11,810	10,981	10,241
9,000	17,425	16,037	14,813	13,728	12,764	11,904
9,500	19,858	18,277	16,881	15,645	14,546	13,566
10,000	22,292	20,517	18,950	17,563	16,329	15,229
10,500	24,726	22,757	21,019	19,480	18,112	16,892
11,000	27,160	24,997	23,088	21,397	19,894	18,554
11,500	29,594	27,237	25,157	23,315	21,677	20,217
12,000	32,027	29,477	27,226	25,232	23,460	21,879

* With a 20 year repayment period

For example, at a milk production level of 8,000 litres per cow, the contribution margin would be $1,008 per cow. This margin, if amortized over 20 years at 7% interest, results in a debt carrying capacity of $10,675 per cow.

Figure 24 shows the impact of milk productivity on the debt load carrying capacity of dairy enterprises given an interest rate of 7%. As productivity declines, the debt carrying capacity of each cow also declines. Conversely, the debt carrying capacity rises as productivity increases. Contribution margins become negative at production levels below about 5,420 litres per cow.

Figure 24 - Debt Load Capacity / Cow (2000-2002)
(7% interest rate, 20 year payback)



Another way to use this information is to measure the minimum level of productivity required to carry a given debt load at a specific interest rate. The average annual investment for 2002 was estimated at $10,990 per cow, while the average debt was $4,048 per cow. At an interest rate of 7%, this amount of debt per cow would only be supported at production levels of about 6,400 litres per cow and above (Table 14). In general, as productivity increases and/or interest rates fall, debt repayment or financing capacity increases.

To this point, the value of quota has not been included in the analysis. If externally financed quota valued at $20,268 per cow (the average value of quota for one cow in the 2002 Dairy Cost Study) is added to current debt of $4,048 per cow, the total amount of debt load per cow would be $24,316. The ability to carry this amount of debt per cow is dependent upon the prevailing interest rate and the productivity of each cow carrying debt. As illustrated in Table 14, this level of debt would require a production level of just over 11,000 litres per cow, assuming an interest rate of 7%.

Impact of Quota Values on Dairy Returns

The cost and return analysis in this study does not include any value for milk quota. However, new entrants into the dairy business would have to purchase quota. When the financing of these quota purchases (at 2002 Dairy Cost Study average prices) is taken into account, the average rate of return for new entrants would be a negative 8.9% (Table 15). This means that the borrowing costs of capital used to purchase quota exceeded the financial returns obtained from producing milk. Borrowing costs were high as a result of the high quota prices for both fluid and industrial production. The assumption in this analysis is that all funds needed to purchase quota were borrowed at 6.23%, the average interest rate in the study.

Table 15

Impact of Quota Value on Dairy Returns, 2002

	2002 Study Average	Including Quota Value*
	--- $ per Farm ---	
Dairy Investment	1,032,617	2,936,817
Debt	380,313	2,284,512
Equity	652,305	652,305
	--- $ per hL Sold ---	
Equity	76.51	76.51
Gross Income	63.16	63.16
Production Costs	56.04	56.04
Interest Cost for Quota		13.91
Potential Total Cost	56.04	69.95
Return to Equity($ per hL)	7.12	-6.79
Return to Equity (%)	9.3	-8.9

*Applicable to new entrants who borrow 100% of funds needed to purchase fluid and MSQ at the average quota values from the 2002 Dairy Cost Study (fluid quota - $856.00 per litre; MSQ - $55.77 per kg.)

APPENDIX A

Alberta

Average Dairy Farm Summary

2002

Alberta

2002 Dairy Cost Study - Business Analysis

59 Participants

Table 1 Dairy Enterprise Costs and Returns

	TOTAL ENTERPRISE	PER COW	PER HL SOLD	PERCENT FROM INCOME
INCOME:				
MILK SALES	514,130.27	5,472.10	60.30	
MILK SUBSIDY	.00	.00	.00	
POOL ADJUSTMENTS (+ -)	(12,860.73)	(136.88)	(1.51)	
MISCELLANEOUS RECEIPTS	1,497.85	15.94	.18	
NET CATTLE SALES (+ -)	33,415.87	355.66	3.92	
NET INVENTORY CHANGE (+ -)	2,297.46	24.45	.27	
GROSS INCOME	**538,480.72**	**5,731.27**	**63.16**	**100.00**
EXPENSES:				
GRAIN	25,409.74	270.45	2.98	
COMPLETE FEED	65,706.05	699.34	7.71	
SUPPLEMENT	16,513.15	175.76	1.94	
MINERALS & VITAMINS	1,210.23	12.88	.14	
ROUGHAGE	75,354.87	802.03	8.84	
PROCESSING COSTS	1,228.76	13.08	.14	
TOTAL FEED COSTS	185,422.79	1,973.53	21.75	34.43
BEDDING AND SUPPLIES	17,534.31	186.62	2.06	
BREEDING	6,737.29	71.71	.79	
VET. AND MEDICINE	12,512.10	133.17	1.47	
MILK HAULING	16,384.60	174.39	1.92	
PRODUCER'S FEES	11,612.09	123.59	1.36	
UTILITIES	13,682.40	145.63	1.60	
FUEL, OIL, LUBE	5,091.58	54.19	.60	
BLDG. & MACH. REPAIRS	18,045.18	192.06	2.12	
MISCELLANEOUS	20,733.14	220.67	2.43	
TOTAL OTHER VARIABLE COSTS	122,332.68	1,302.04	14.35	22.72
HIRED LABOUR	26,582.49	282.93	3.12	
FAMILY LABOUR	54,761.64	582.85	6.42	
TOTAL LABOUR COSTS	81,344.14	865.78	9.54	15.11
TOTAL VARIABLE COSTS	389,099.61	4,141.35	45.64	72.26
RENT	2,729.69	29.05	.32	
TAXES AND INSURANCE	9,256.65	98.52	1.09	
DEPRECIATION	53,000.57	564.11	6.22	
INTEREST (CAP DEBT)	23,710.21	252.36	2.78	
TOTAL CAPITAL COSTS	88,697.11	944.04	10.40	16.47
TOTAL PRODUCTION COSTS	477,796.72	5,085.39	56.04	88.73
CONTRIBUTION MARGIN ($)	149,381.11	1,589.93	17.52	
RETURN TO EQUITY ($)	60,684.00	645.88	7.12	11.27
MILK PRICE			58.79	
INVENTORY ADJUSTMENT			4.36	
RETURN TO EQUITY (%)			9.30	
AVERAGE CAP. DEBT INTEREST RATE (%)			6.23	

Alberta
2002 Dairy Cost Study - Business Analysis
59 Participants
Table 2 Statement of Investment

LAND BUILDINGS & EQUIPMENT	AGE	DEPRECIATION	DAIRY INVESTMENT
DAIRY BUILDINGS	9.99	22,397.20	**546,450.51**
POWER MACHINERY	6.71	11,109.62	73,643.04
DAIRY EQUIPMENT	8.72	12,517.68	54,818.92
OTHER EQUIPMENT	9.92	6,976.07	29,163.94
TOTAL EQUIPMENT	**7.95**	**30,603.37**	**157,625.90**
LAND			40,880.05
SUPPLIES			15,308.87
** SUBTOTAL **		**53,000.57**	**760,265.33**

DAIRY LIVESTOCK	— BEGIN YEAR — NUMBER	VALUE	— END OF YEAR — NUMBER	VALUE	AVERAGE VALUE
COWS	94.27	166,164.16	95.42	168,195.65	167,179.90
BRED HEIFERS	27.93	47,484.75	29.51	50,164.41	48,824.58
OPEN HEIFERS	28.49	34,189.83	26.93	32,318.64	33,254.24
HEIFER CALVES	26.49	6,622.88	27.19	6,796.61	6,709.75
BULL CALVES	12.56	1,883.90	7.07	1,060.17	1,472.03
BULLS	1.27	1,906.78	1.24	1,855.93	1,881.36
** SUBTOTAL **	**191.02**	271,203.39	187.36	273,500.85	272,352.12

TOTAL DAIRY INVESTMENT	**1,032,617.45**
CAPITAL LOANS	380,312.62
OPERATOR EQUITY	652,304.82
INVESTMENT PER COW	10,990.58
DEBT/CAPITAL RATIO	.37
CAPITAL TURNOVER (YR)	1.92

HERD SIZE	Average	Median
NUMBER OF DAIRY COWS	93.95	81.08
NUMBER OF ANIMAL UNITS	144.24	120.75
DRY COWS (%)	16.81	
CALF CROP (%)	96.48	
PASTURE PER COW (AC.)	.35	

CATTLE SALES & PURCHASES	NUMBER	SELLING PRICE	NUMBER	PURCHASE PRICE
COWS	25.81	881.42	1.03	1,881.91
BRED HEIFERS	3.25	1,938.41	.20	1,645.83
OPEN HEIFERS	1.14	1,276.62	.05	1,966.67
HEIFER CALVES	.42	401.96	1.12	266.67
BULL CALVES	32.54	164.59	.05	653.33
BULLS	.44	1,231.57	.25	1,776.67
TOTAL VALUE		36,579.53		3,163.67

Alberta
2002 Dairy Cost Study - Business Analysis
59 Participants
Table 3 Labour and Management

LABOUR

	HOURS	VALUE	HOURLY RATE
OPERATOR LABOUR	2,543.82	38,157.33	15.00
HIRED LABOUR	1,743.62	26,582.49	15.25
FAMILY UNPAID LABOUR	1,196.89	16,604.31	13.87
TOTAL	**5,484.33**	**81,344.14**	**14.83**

RETURN TO FAMILY LABOUR	11.68
MAN EQUIVALENTS	2.19
LABOUR HOURS PER COW	58.37
YEARS FARMING	20.11

MILK PRODUCTION

	HL.	% OF TOTAL	VALUE	PRICE
CLASS I MILK	4,249.94	48.23	292,055.20	68.72
INDUSTRIAL MILK	3,719.48	42.21	211,376.27	56.83
4M MILK	249.12	2.83	2,518.85	10.11
CONTRACTED EXPORT MILK	307.52	3.49	8,179.96	26.60
SUB-TOTAL	8,526.06	96.76	514,130.27	60.30
OTHER MILK SALES	.00	.00	.00	.00
FED TO LIVESTOCK	285.35	3.24	17,653.14	61.87
TOTAL	**8,811.41**	**100.00**	**531,783.41**	**60.35**

FLUID QUOTA	1,345.25 LITRES/DAY
MSQ QUOTA	13,495.88 KG/YR
FLUID QUOTA PRICE	856.00 $/LITRE
MSQ QUOTA PRICE	55.77 $/KG
CLASS 1 UTILIZATION	85.67 %

		COMPONENT PRICES ($/KG)		
		CLASS I	EXCESS	WORLD
BUTTERFAT TEST	3.58 KG/HL	5.29	6.07	.81
PROTEIN	3.26 KG/HL		7.44	.82
L.O.S.	5.58 KG/HL		1.68	.81

MILK PRODUCTION PER COW 9,378.35 LITRES / YEAR

MANAGEMENT FACTORS

COST PER HL	56.04
CEM COST PER HL	32.81
MILK/FEED (KG) RATIO	2.10 LITRES
MILK/LABOUR (HR) RATIO	160.67 LITRES
MILK/CAPITAL ($) RATIO	.85 LITRES

Alberta
2002 Dairy Cost Study - Business Analysis
59 Participants
Table 4 Feed Report

CONCENTRATES	--- PURCHASED --- QUANTITY (TONNES)	PRICE	--- HOMEGROWN--- QUANTITY (TONNES)	PRICE
OATS	.00	.00	.67	156.22
BARLEY	51.95	148.61	70.00	143.61
WHEAT	.00	.00	.00	.00
MIXED GRAIN	.00	.00	.00	.00
BREW GRAIN (DRY EQ.)	6.96	191.55		
BEET PULP	.26	311.45		
OTHER PURCHASED	27.19	224.96		
DAIRY RATION	206.54	302.47		
CALF FEED	7.89	325.76		
MILK REPLACER	.24	2,785.21		
SUPPLEMENT	45.94	359.08		
MOLASSES	.05	310.00		
SALT	.32	263.80		
MINERALS & VITAMINS	1.19	947.18		
SUBTOTAL ---------	**348.53**	**98,680.84**	**70.67**	**10,158.32**
ROUGHAGE				
ALFALFA HAY	68.41	166.13	110.29	123.47
ALFALFA PELLETS	.71	201.03		
STRAW FED	2.16	52.94	1.34	53.11
GREENFEED	1.12	84.10	3.01	85.15
SILAGE/HAYLAGE (DRY EQ.)	117.96	98.39	343.47	110.89
SUBTOTAL ---------	**190.36**	**23,322.04**	**458.12**	**52,032.83**
GRINDING & PROCESSING		1,228.76		
GRAND TOTAL FEED COSTS ---------		**123,231.64**		62,191.15
BEDDING	69.06	59.76	72.83	53.22

AV. PRICE:	CONCENTRATE	259.63 $/TONNE
	ROUGHAGE	116.20 $/TONNE
FED PER COW:	CONCENTRATE	4.46TONNES
	ROUGHAGE	6.90 TONNES
% HOME GROWN:	CONCENTRATE	16.86 %
	ROUGHAGE	70.65 %

APPENDIX B

Northern Alberta

Average Dairy Farm Summary

2002

Northern Alberta
2002 Dairy Cost Study - Business Analysis
27 Participants
Table 1 Dairy Enterprise Costs and Returns

	TOTAL ENTERPRISE	PER COW	PER HL SOLD	PERCENT FROM INCOME
INCOME:				
MILK SALES	530,517.23	5,486.88	60.74	
MILK SUBSIDY	.00	.00	.00	
POOL ADJUSTMENTS (+ -)	(12,044.93)	(124.57)	(1.38)	
MISCELLANEOUS RECEIPTS	2,043.15	21.13	.23	
NET CATTLE SALES (+ -)	31,744.96	328.32	3.63	
NET INVENTORY CHANGE (+ -)	(387.04)	(4.00)	(.04)	
GROSS INCOME	**551,873.38**	**5,707.76**	**63.18**	**100.00**
EXPENSES:				
GRAIN	31,841.39	329.32	3.65	
COMPLETE FEED	58,212.81	602.07	6.66	
SUPPLEMENT	15,847.67	163.90	1.81	
MINERALS & VITAMINS	1,803.65	18.65	.21	
ROUGHAGE	73,477.73	759.94	8.41	
PROCESSING COSTS	1,866.74	19.31	.21	
TOTAL FEED COSTS	**183,049.99**	**1,893.20**	**20.96**	**33.17**
BEDDING AND SUPPLIES	17,188.73	177.77	1.97	
BREEDING	7,403.60	76.57	.85	
VET. AND MEDICINE	13,749.54	142.20	1.57	
MILK HAULING	16,716.35	172.89	1.91	
PRODUCER'S FEES	11,562.11	119.58	1.32	
UTILITIES	14,859.64	153.69	1.70	
FUEL, OIL, LUBE	4,853.93	50.20	.56	
BLDG. & MACH. REPAIRS	19,114.05	197.69	2.19	
MISCELLANEOUS	17,704.33	183.11	2.03	
TOTAL OTHER VARIABLE COSTS	**123,152.29**	**1,273.70**	**14.10**	**22.32**
HIRED LABOUR	28,735.42	297.20	3.29	
FAMILY LABOUR	54,794.61	566.71	6.27	
TOTAL LABOUR COSTS	**83,530.03**	**863.91**	**9.56**	**15.14**
TOTAL VARIABLE COSTS	**389,732.32**	**4,030.81**	**44.62**	**70.62**
RENT	2,865.39	29.64	.33	
TAXES AND INSURANCE	10,266.09	106.18	1.18	
DEPRECIATION	55,247.48	571.40	6.33	
INTEREST (CAP DEBT)	21,940.84	226.92	2.51	
TOTAL CAPITAL COSTS	**90,319.80**	**934.13**	**10.34**	**16.37**
TOTAL PRODUCTION COSTS	**480,052.12**	**4,964.93**	**54.96**	**86.99**
CONTRIBUTION MARGIN ($)	162,141.06	1,676.95	18.56	
RETURN TO EQUITY ($)	71,821.26	742.81	8.22	13.01
MILK PRICE			59.36	
INVENTORY ADJUSTMENT			3.82	
RETURN TO EQUITY (%)			10.19	
AVERAGE CAP. DEBT INTEREST RATE (%)			6.33	

Northern Alberta
2002 Dairy Cost Study - Business Analysis
27 Participants
Table 2 Statement of Investment

LAND BUILDINGS & EQUIPMENT	AGE	DEPRECIATION	DAIRY INVESTMENT
DAIRY BUILDINGS	10.24	22,554.75	551,439.61
POWER MACHINERY	7.67	10,898.82	71,203.99
DAIRY EQUIPMENT	8.05	15,344.48	68,921.27
OTHER EQUIPMENT	6.54	6,449.44	30,591.29
TOTAL EQUIPMENT	7.62	32,692.73	170,716.55
LAND			40,280.46
SUPPLIES			18,979.46
** SUBTOTAL **		55,247.48	781,416.08

DAIRY LIVESTOCK	— BEGIN YEAR —		— END OF YEAR —		AVERAGE
	NUMBER	VALUE	NUMBER	VALUE	VALUE
COWS	97.74	171,362.12	96.52	169,219.28	170,290.70
BRED HEIFERS	24.04	40,862.96	25.56	43,444.44	42,153.70
OPEN HEIFERS	27.70	33,244.44	28.63	34,355.56	33,800.00
HEIFER CALVES	27.70	6,925.93	27.41	6,851.85	6,888.89
BULL CALVES	17.48	2,622.22	7.37	1,105.56	1,863.89
BULLS	.44	666.67	.33	500.00	583.33
** SUBTOTAL **	195.11	270,029.63	185.81	269,642.59	269,836.11

TOTAL DAIRY INVESTMENT	1,051,252.20
CAPITAL LOANS	346,679.60
OPERATOR EQUITY	704,572.60
INVESTMENT PER COW	10,872.59
DEBT/CAPITAL RATIO	.33
CAPITAL TURNOVER (YR)	1.90

HERD SIZE	Average	Median
NUMBER OF DAIRY COWS	96.69	82.92
NUMBER OF ANIMAL UNITS	144.74	120.75
DRY COWS (%)	14.94	
CALF CROP (%)	98.18	
PASTURE PER COW (AC.)	.48	

CATTLE SALES & PURCHASES	NUMBER	SELLING PRICE	NUMBER	PURCHASE PRICE
COWS	26.78	838.92	1.07	1,427.59
BRED HEIFERS	3.11	1,939.14	.37	1,410.00
OPEN HEIFERS	.96	1,114.04	.04	1,500.00
HEIFER CALVES	.74	454.15	.00	.00
BULL CALVES	30.00	128.26	.00	.00
BULLS	.37	1,194.93	.19	1,840.00
TOTAL VALUE		34,196.81		2,451.85

Northern Alberta
2002 Dairy Cost Study - Business Analysis
27 Participants
Table 3 Labour and Management

LABOUR

	HOURS	VALUE	HOURLY RATE
OPERATOR LABOUR	2,486.54	37,298.06	15.00
HIRED LABOUR	1,860.67	28,735.42	15.44
FAMILY UNPAID LABOUR	1,294.48	17,496.56	13.52
TOTAL	5,641.68	83,530.03	14.81

RETURN TO FAMILY LABOUR	12.99
MAN EQUIVALENTS	2.26
LABOUR HOURS PER COW	58.35
YEARS FARMING	19.98

MILK PRODUCTION

	HL.	% OF TOTAL	VALUE	PRICE
CLASS I MILK	4,762.24	53.00	327,714.73	68.82
INDUSTRIAL MILK	3,278.09	36.48	188,703.52	57.57
4M MILK	291.99	3.25	2,958.50	10.13
CONTRACTED EXPORT MILK	402.05	4.47	11,140.48	27.71
SUB-TOTAL	8,734.37	97.21	530,517.23	60.74
OTHER MILK SALES	.00	.00	.00	.00
FED TO LIVESTOCK	250.88	2.79	15,747.57	62.77
TOTAL	8,985.25	100.00	546,264.80	60.80

FLUID QUOTA	1,519.26 LITRES/DAY
MSQ QUOTA	12,123.00 KG/YR
FLUID QUOTA PRICE	856.69 $/LITRE
MSQ QUOTA PRICE	55.74 $/KG
CLASS 1 UTILIZATION	85.67 %

		COMPONENT PRICES ($/KG)		
		CLASS I	EXCESS	WORLD
BUTTERFAT TEST	3.59 KG/HL	5.29	6.07	.82
PROTEIN	3.26 KG/HL		7.46	.82
L.O.S.	5.60 KG/HL		1.68	.82

MILK PRODUCTION PER COW 9,293.01 LITRES / YEAR

MANAGEMENT FACTORS

COST PER HL	54.96
CEM COST PER HL	31.82
MILK/FEED (KG) RATIO	2.09 LITRES
MILK/LABOUR (HR) RATIO	159.27 LITRES
MILK/CAPITAL ($) RATIO	.85 LITRES

Northern Alberta
2002 Dairy Cost Study - Business Analysis
27 Participants
Table 4 Feed Report

CONCENTRATES	--- PURCHASED --- QUANTITY (TONNES)	PRICE	--- HOMEGROWN--- QUANTITY (TONNES)	PRICE
OATS	.00	.00	.86	147.70
BARLEY	59.35	150.61	89.61	139.26
WHEAT	.00	.00	.00	.00
MIXED GRAIN	.00	.00	.00	.00
BREW GRAIN (DRY EQ.)	10.78	206.32		
BEET PULP	.57	311.45		
OTHER PURCHASED	37.57	210.15		
DAIRY RATION	178.87	307.26		
CALF FEED	6.04	373.35		
MILK REPLACER	.36	2,756.42		
SUPPLEMENT	44.24	358.24		
MOLASSES	.00	.00		
SALT	.38	258.15		
MINERALS & VITAMINS	1.74	981.93		
SUBTOTAL - - - - - - - - -	339.90	95,099.58	90.47	12,606.94
ROUGHAGE				
ALFALFA HAY	100.36	161.55	90.84	119.90
ALFALFA PELLETS	1.54	200.20		
STRAW FED	1.04	72.32	1.40	53.31
GREENFEED	.20	44.00	3.24	82.10
SILAGE/HAYLAGE (DRY EQ.)	140.48	95.71	300.81	107.03
SUBTOTAL - - - - - - - - -	243.62	30,050.34	396.29	43,427.38
GRINDING & PROCESSING		1,866.74		
GRAND TOTAL FEED COSTS - - - - - - - - -		127,016.67		56,033.32
BEDDING	56.74	53.30	65.01	53.22

AV. PRICE:	CONCENTRATE	250.27 $/TONNE
	ROUGHAGE	114.83 $/TONNE
FED PER COW:	CONCENTRATE	4.45TONNES
	ROUGHAGE	6.62 TONNES
% HOME GROWN:	CONCENTRATE	21.02 %
	ROUGHAGE	61.93 %

APPENDIX C

Southern Alberta

Average Dairy Farm Summary

2002

Southern Alberta
2002 Dairy Cost Study - Business Analysis
32 Participants
Table 1 Dairy Enterprise Costs and Returns

	TOTAL ENTERPRISE	PER COW	PER HL SOLD	PERCENT FROM INCOME
INCOME:				
MILK SALES	500,303.78	5,458.94	59.91	
MILK SUBSIDY	00	00	00	
POOL ADJUSTMENTS (+ -)	(13,549.06)	(147.84)	(1.62)	
MISCELLANEOUS RECEIPTS	1,037.75	11.32	.12	
NET CATTLE SALES (+ -)	34,825.69	379.99	4.17	
NET INVENTORY CHANGE (+ -)	4,562.50	49.78	.55	
GROSS INCOME	527,180.66	5,752.21	63.13	100.00
EXPENSES:				
GRAIN	19,983.04	218.04	2.39	
COMPLETE FEED	72,028.46	785.92	8.63	
SUPPLEMENT	17,074.65	186.31	2.04	
MINERALS & VITAMINS	709.53	7.74	.08	
ROUGHAGE	76,938.70	839.50	9.21	
PROCESSING COSTS	690.45	7.53	.08	
TOTAL FEED COSTS	187,424.84	2,045.04	22.45	35.55
BEDDING AND SUPPLIES	17,825.89	194.50	2.13	
BREEDING	6,175.09	67.38	.74	
VET. AND MEDICINE	11,468.02	125.13	1.37	
MILK HAULING	16,104.68	175.72	1.93	
PRODUCER'S FEES	11,654.25	127.16	1.40	
UTILITIES	12,689.11	138.45	1.52	
FUEL, OIL, LUBE	5,292.09	57.74	.63	
BLDG. & MACH. REPAIRS	17,143.31	187.06	2.05	
MISCELLANEOUS	23,288.70	254.11	2.79	
TOTAL OTHER VARIABLE COSTS	121,641.14	1,327.26	14.57	23.07
HIRED LABOUR	24,765.96	270.23	2.97	
FAMILY LABOUR	54,733.83	597.22	6.55	
TOTAL LABOUR COSTS	79,499.78	867.44	9.52	15.08
TOTAL VARIABLE COSTS	388,565.76	4,239.74	46.53	73.71
RENT	2,615.20	28.54	.31	
TAXES AND INSURANCE	8,404.93	91.71	1.01	
DEPRECIATION	51,104.73	557.62	6.12	
INTEREST (CAP DEBT)	25,203.11	275.00	3.02	
TOTAL CAPITAL COSTS	87,327.97	952.86	10.46	16.57
TOTAL PRODUCTION COSTS	475,893.73	5,192.60	56.99	90.27
CONTRIBUTION MARGIN ($)	138,614.90	1,512.46	16.60	
RETURN TO EQUITY ($)	51,286.93	559.61	6.14	9.73
MILK PRICE			58.29	
INVENTORY ADJUSTMENT			4.84	
RETURN TO EQUITY (%)			8.43	
AVERAGE CAP. DEBT INTEREST RATE (%)			6.17	

Southern Alberta
2002 Dairy Cost Study - Business Analysis
32 Participants
Table 2 Statement of Investment

LAND BUILDINGS & EQUIPMENT	AGE	DEPRECIATION	DAIRY INVESTMENT
DAIRY BUILDINGS	9.78	22,264.27	542,253.60
POWER MACHINERY	5.95	11,287.48	75,682.70
DAIRY EQUIPMENT	9.59	10,132.58	42,916.68
OTHER EQUIPMENT	12.31	7,420.41	28,059.96
TOTAL EQUIPMENT	8.25	28,840.47	146,659.34
LAND			41,385.95
SUPPLIES			12,211.81
** SUBTOTAL **		51,104.73	742,510.71

DAIRY LIVESTOCK	— BEGIN YEAR — NUMBER	VALUE	— END OF YEAR — NUMBER	VALUE	AVERAGE VALUE
COWS	91.34	161,767.49	94.50	167,357.13	164,562.31
BRED HEIFERS	31.22	53,071.88	32.84	55,834.38	54,453.13
OPEN HEIFERS	29.16	34,987.50	25.50	30,600.00	32,793.75
HEIFER CALVES	25.47	6,367.19	27.00	6,750.00	6,558.59
BULL CALVES	8.41	1,260.94	6.81	1,021.88	1,141.41
BULLS	1.97	2,953.13	2.00	3,000.00	2,976.56
** SUBTOTAL **	187.56	272,193.75	188.66	276,756.25	274,475.00

TOTAL DAIRY INVESTMENT	1,016,985.71
CAPITAL LOANS	408,690.49
OPERATOR EQUITY	608,295.22
INVESTMENT PER COW	11,096.60
DEBT/CAPITAL RATIO	40
CAPITAL TURNOVER (YR)	1.93

HERD SIZE	Average	Median
NUMBER OF DAIRY COWS	91.65	81.04
NUMBER OF ANIMAL UNITS	143.82	119.00
DRY COWS (%)	18.48	
CALF CROP (%)	94.96	
PASTURE PER COW (AC)	.23	

CATTLE SALES & PURCHASES	NUMBER	SELLING PRICE	NUMBER	PURCHASE PRICE
COWS	25.00	919.83	1.00	2,293.63
BRED HEIFERS	3.38	1,937.85	.06	2,825.00
OPEN HEIFERS	1.28	1,379.72	.06	2,200.00
HEIFER CALVES	.16	193.19	2.06	266.67
BULL CALVES	34.69	191.10	.09	653.33
BULLS	.50	1,254.48	.31	1,745.00
TOTAL VALUE		38,589.95		3,764.26

Southern Alberta
2002 Dairy Cost Study - Business Analysis
32 Participants
Table 3 Labour and Management

LABOUR	HOURS	VALUE	HOURLY RATE
OPERATOR LABOUR	2,592.16	38,882.34	15.00
HIRED LABOUR	1,644.87	24,765.96	15.06
FAMILY UNPAID LABOUR	1,114.55	15,851.48	14.22
TOTAL	5,351.57	79,499.78	14.86

RETURN TO FAMILY LABOUR	10.55
MAN EQUIVALENTS	2.14
LABOUR HOURS PER COW	58.39
YEARS FARMING	20.22

MILK PRODUCTION	HL	% OF TOTAL	VALUE	PRICE
CLASS I MILK	3,817.69	44.06	261,967.46	68.62
INDUSTRIAL MILK	4,091.90	47.22	230,506.41	56.33
4M MILK	212.95	2.46	2,147.90	10.09
CONTRACTED EXPORT MILK	227.76	2.63	5,682.01	24.95
SUB-TOTAL	8,350.30	96.37	500,303.78	59.91
OTHER MILK SALES	.00	.00	.00	.00
FED TO LIVESTOCK	314.43	3.63	19,260.97	61.26
TOTAL	8,664.73	100.00	519,564.74	59.96

FLUID QUOTA	1,198.44 LITRES/DAY
MSQ QUOTA	14,654.25 KG/YR
FLUID QUOTA PRICE	855.51 $/LITRE
MSQ QUOTA PRICE	55.79 $/KG
CLASS 1 UTILIZATION	85.67 %

		COMPONENT PRICES ($/KG)		
		CLASS I	EXCESS	WORLD
BUTTERFAT TEST	3.58 KG/HL	5.28	6.07	.81
PROTEIN	3.25 KG/HL		7.42	.81
L.O.S.	5.57 KG/HL		1.68	.81

MILK PRODUCTION PER COW 9,454.32 LITRES / YEAR

MANAGEMENT FACTORS

COST PER HL	56.99
CEM COST PER HL	33.69
MILK/FEED (KG) RATIO	2.11 LITRES
MILK/LABOUR (HR) RATIO	161.91 LITRES
MILK/CAPITAL ($) RATIO	.85 LITRES

Southern Alberta
2002 Dairy Cost Study - Business Analysis
32 Participants
Table 4 Feed Report

	--- PURCHASED ---		--- HOMEGROWN---	
CONCENTRATES	**QUANTITY (TONNES)**	**PRICE**	**QUANTITY (TONNES)**	**PRICE**
OATS	.00	.00	.51	168.21
BARLEY	45.71	146.42	53.46	149.78
WHEAT	.00	.00	.00	.00
MIXED GRAIN	.00	.00	.00	.00
BREW GRAIN (DRY EQ.)	3.74	155.65		
BEET PULP	.00	.00		
OTHER PURCHASED	18.43	250.43		
DAIRY RATION	229.89	299.32		
CALF FEED	9.46	300.11		
MILK REPLACER	.13	2,851.20		
SUPPLEMENT	47.38	359.73		
MOLASSES	.10	310.00		
SALT	.26	270.82		
MINERALS & VITAMINS	.73	877.30		
SUBTOTAL - - - - - - - - -	**355.82**	**101,702.54**	**53.97**	**8,093.15**
ROUGHAGE				
ALFALFA HAY	41.45	175.48	126.71	125.62
ALFALFA PELLETS	.00	477.60		
STRAW FED	3.11	47.49	1.29	52.93
GREENFEED	1.90	87.70	2.82	88.12
SILAGE/HAYLAGE (DRY EQ.)	98.96	101.61	379.47	113.47
SUBTOTAL - - - - - - - - -	**145.42**	**17,645.03**	**510.29**	**59,293.67**
GRINDING & PROCESSING		690.45		
GRAND TOTAL FEED COSTS - - - - - - - - -		**120,038.02**		**67,386.82**
BEDDING	79.45	63.65	79.43	53.22

AV. PRICE:	CONCENTRATE	267.93 $/TONNE
	ROUGHAGE	117.34 $/TONNE
FED PER COW:	CONCENTRATE	4.47TONNES
	ROUGHAGE	7.15 TONNES
% HOME GROWN:	CONCENTRATE	13.17 %
	ROUGHAGE	77.82 %

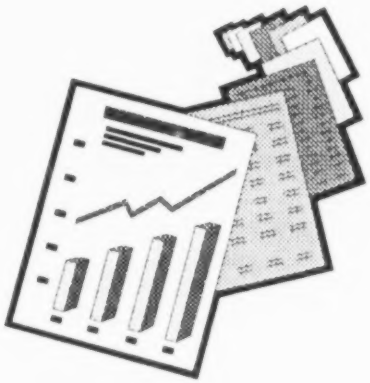
APPENDIX D

Charts Showing Individual Results

for Dairy Study Participants

2002

Dairy Cost Study 2002



Individual Results

FIGURE 1. HERD SIZE

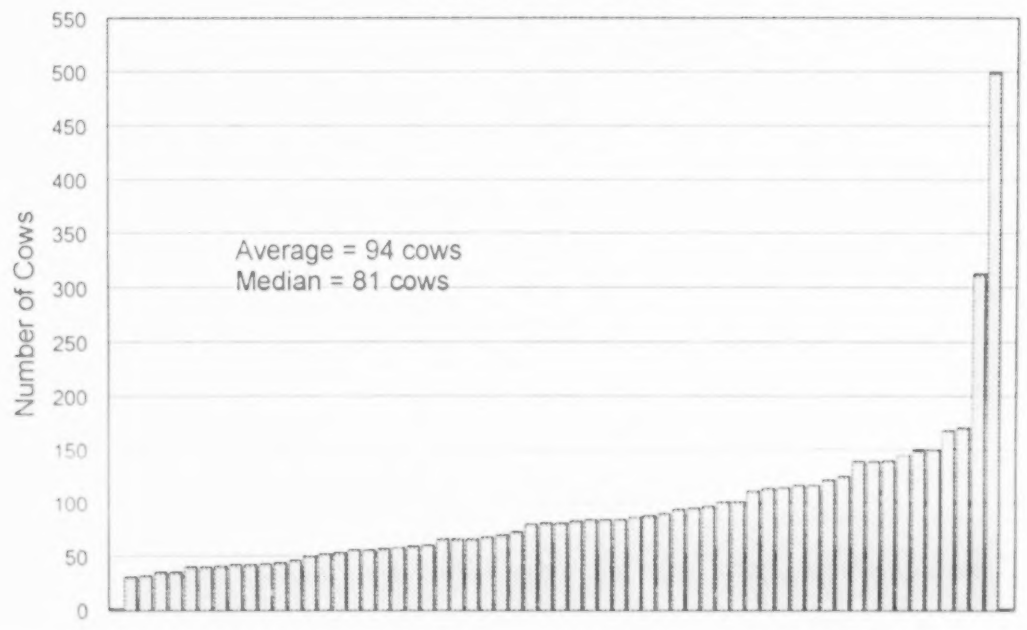


FIGURE 2. MILK PRODUCTION
(Litres/Cow)

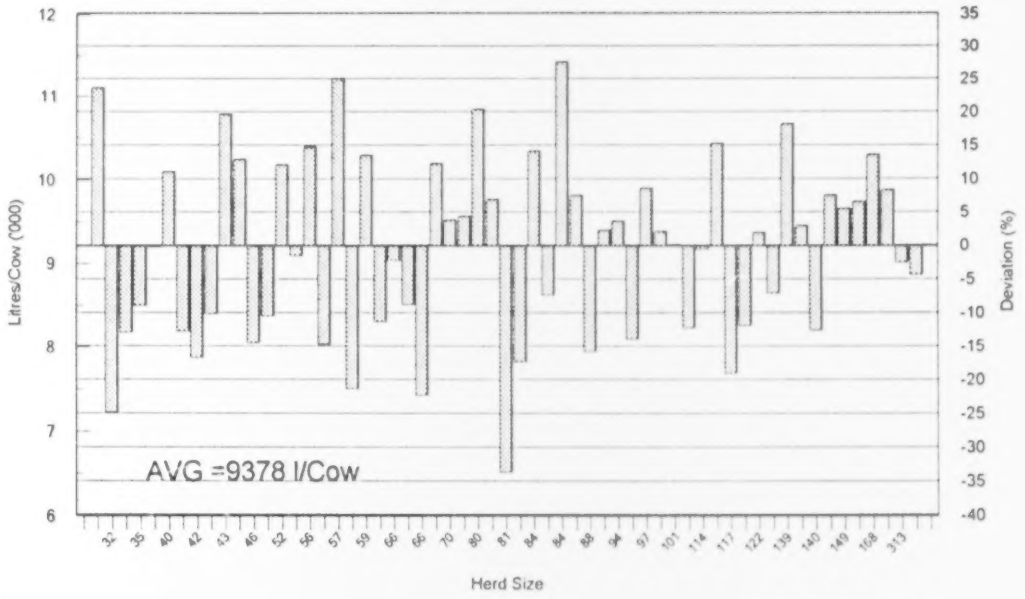


FIGURE 3. COST OF PRODUCTION
(Dollars/hl)

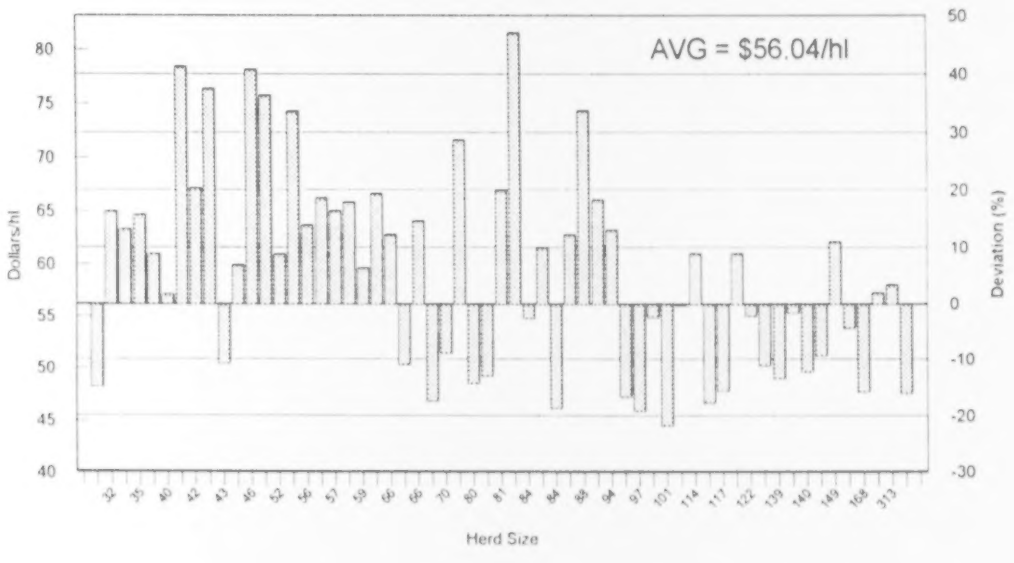


FIGURE 4. CONCENTRATE USE
(Tonnes/Cow)

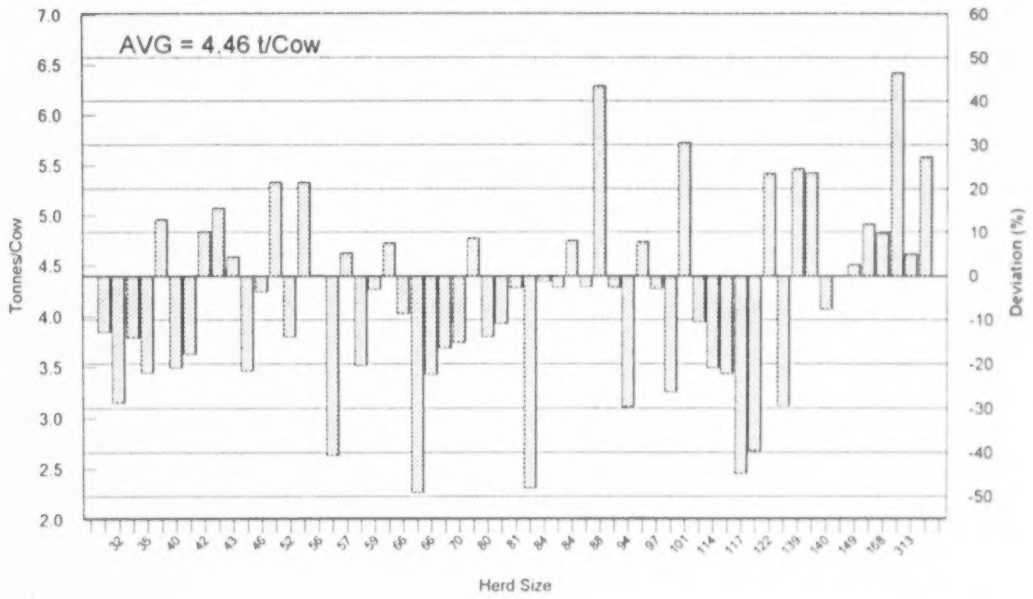


FIGURE 5. ROUGHAGE USE
(Tonnes/Cow)

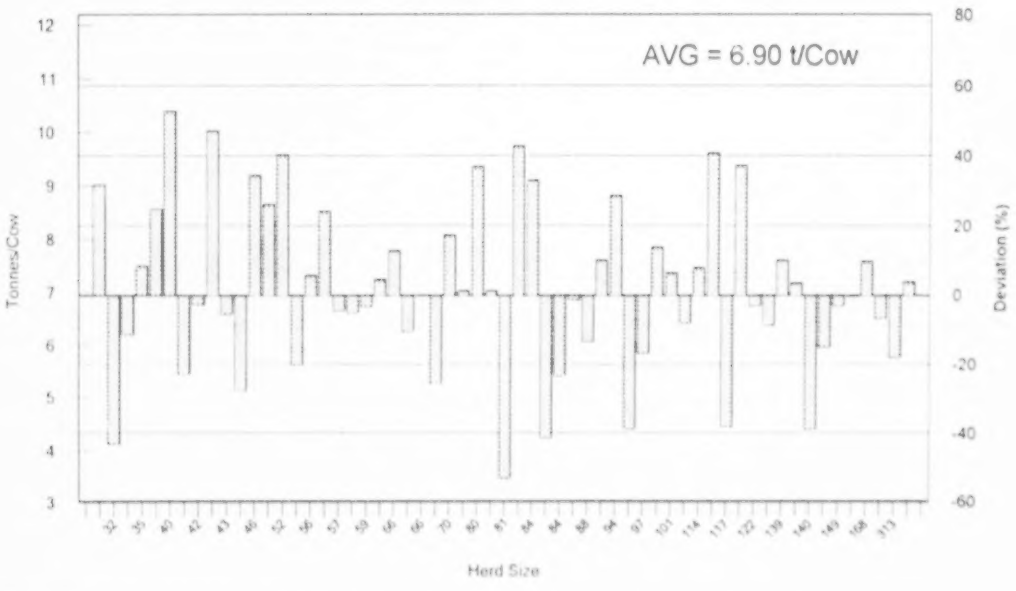


FIGURE 6. LABOUR USE
(Hours/Cow)

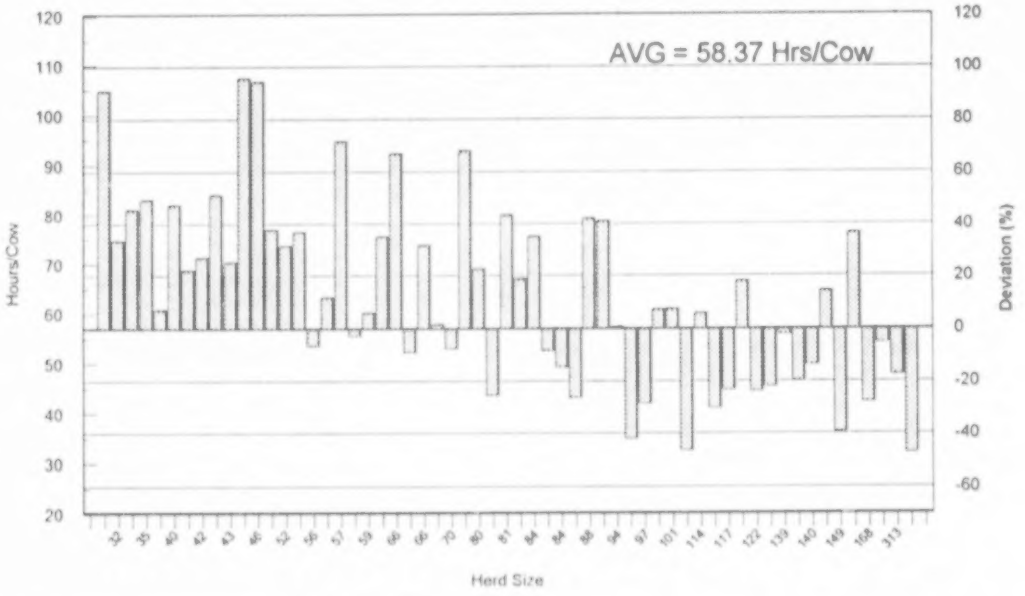


FIGURE 7. INVESTMENT
(Dollars/Cow)

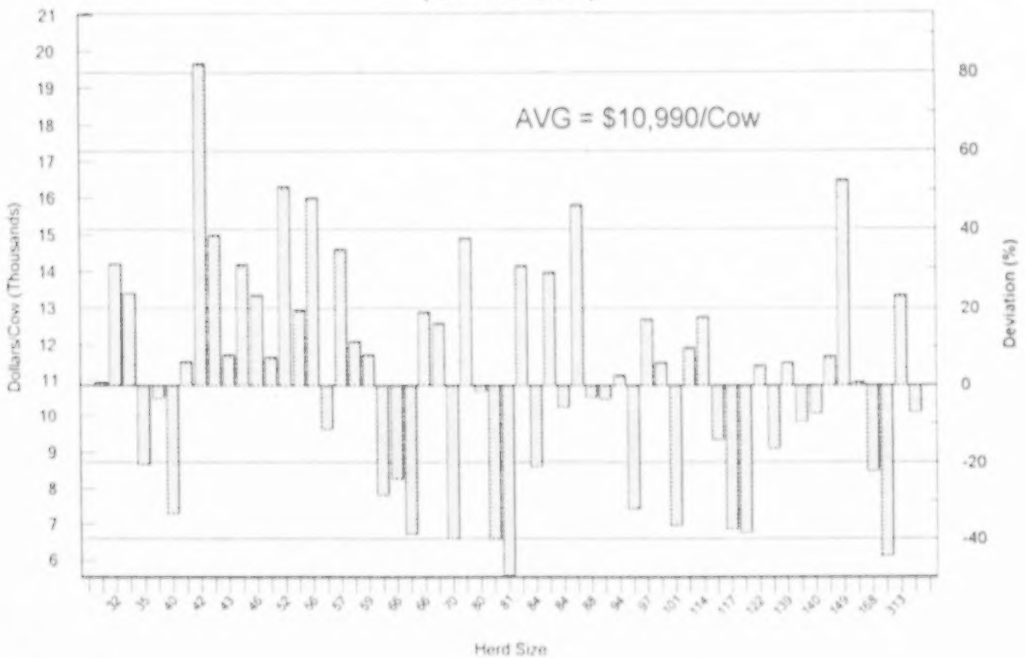


FIGURE 8. COST OF PRODUCTION FOR CONTRACTED EXPORT MILK
($ per hl)

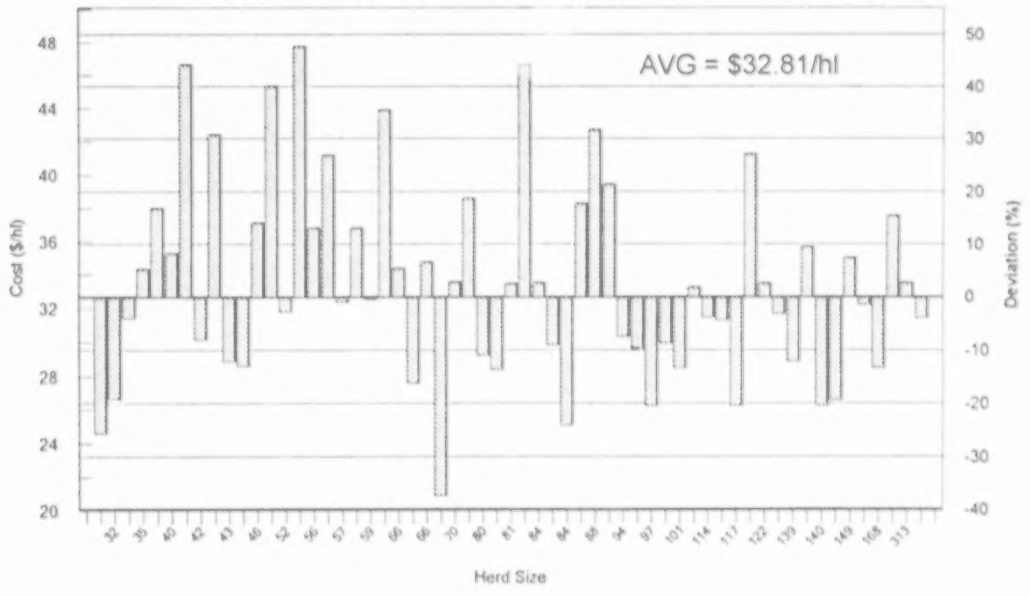
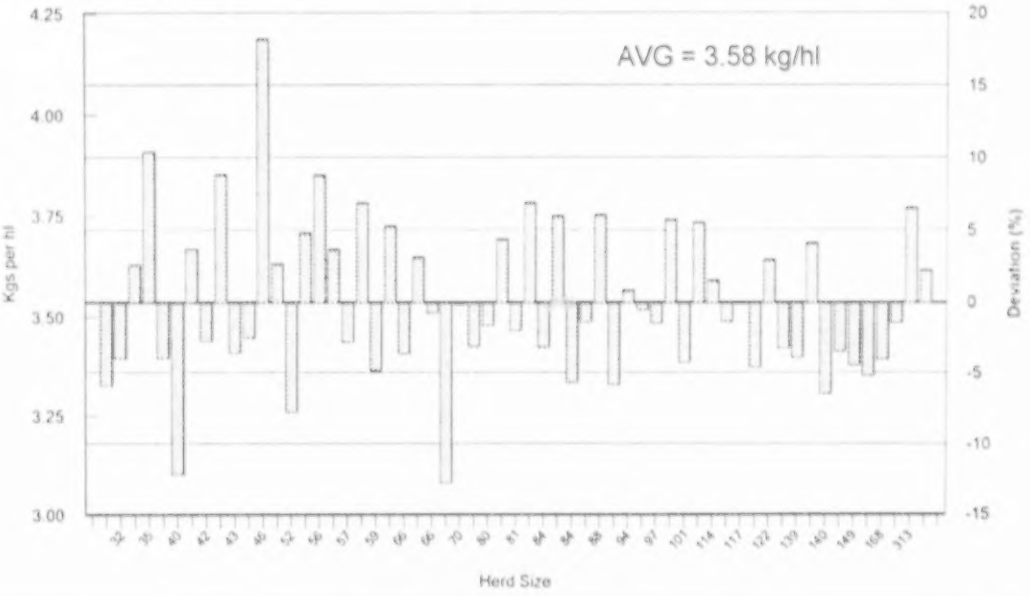


FIGURE 9. BUTTERFAT TEST
(Kgs per hl)



APPENDIX E

Monthly / Annual Questionnaire

2002

DAIRY COST SURVEY, 2002

Monthly Reporting Sheet

Confidential

Name:

Month:

If you have any questions, please call Pauline Van Biert at (780) 415-2153, toll free by first dialing 310-0000

Code	DAIRY HERD	Beginning No.	Purchases No.	Purchases Value	No. Born	Died or Trans/Out	Sales No.	Sales Value	End No.
1	Milking Cows								
2	Dry Cows								
3	Bred Heifers								
4	Open Heifers								
5	Heifer Calves								
6	Bull Calves								
7	Herd Bulls								

Code	CAPITAL PURCHASES	Specify		Total Value ($)	% to Dairy	% to Crops	% to Other Livestock
1	Equipment	*Purchases:*					
2		*Sales:*					
3	Tractor/Truck	*Purchases:*					
4		*Sales:*					
5	Buildings	*Purchases/Const:*					
6		*Sales:*					
7	Fluid Quota	*Purchased:*	(litres)				
8		*Sold:*	(litres)				
		Leased:	(litres)				
9	MSQ Quota	*Purchased:*	(kg)				
10		*Sold:*	(kg)				
		Leased:	(kg)				

Code	SALES*	Litres	Value
2	Milk Fed To Livestock		
3	Milk Home Use		
4	Unuseable Milk		
5	Miscellaneous Dairy Income - Specify		
34	Contract Export Milk		

* All Plant Sales will be recorded from Milk Statement

Code	FEED Used by Dairy Herd	Office Use	Unit Type*	Amount Used	Price (if purchased)	Cd		Office Use	Unit Type *	Amount Used	Price per Unit
1	Barley					21	Dairy Ration				
2	Oats					22	Supplement				
3	Wheat					23	Brew Grain				
5	Hay: H.G.					24	Beet Pulp				
6	Hay: Purch.					25	Alfalfa Pellets				
7	Silage					26	Calf Feed				
8	Haylage					27	Milk Replacer				
9	Greenfeed					28	Salt				
10	Straw - Fed					29	Min. & Vit.				
11	Straw-Bedding										
11	Sawdust										
12	Other					31	Grinding & Processing				

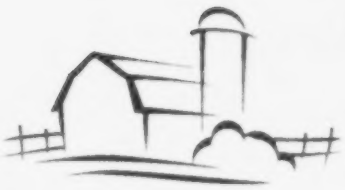
* T = Ton, t = tonne, bu = bushels, kg = kilograms,
ba = bales (please provide weight/bale)

Code	LABOUR to Dairy *		Total Hours	
1	Operator			
2	Wife, Partner			
3	Family Labour	*Over 16*		
4		*Under 16*		Wages & Board
5	Hired Labour	*1*		
5		*2*		
5		*3*		

* do not include hours spent cropping

Code	EXPENSES	Total Farm ($)	% to Dairy	% to Crops	% to Other Livestock
1	Veterinary and Medicine				
1	Breeding				
2	Livestock & Barn Supplies				
3	Building & Fence Repair				
4	Machinery & Equipment Repair				
5	Fuel, Oil, Lube (for equipment, not heating)				
6	Natural Gas (Gj =)				
6	Electricity (kWh =)				
6	Other Utilities (phone, propane, heating oil, etc.)				
7	Insurance, Licences & Taxes				
8	Cash Rental (pasture, equipment, leases, etc.)				
9	Operating Loan Interest				
10	Custom Manure Hauling & Cleaning				
11	Silage Bags (hay tarps, plastic, etc.)				
12	Misc. (legal, acct, D.H.I., etc)				
12					

DAIRY COST SURVEY, 2002
Investments and Liabilities



Confidential

General Information

Name:	Fluid Milk Quota (Jan. 1)	Litres:	
E-Mail:	MSQ Milk Quota (Jan. 1)	kg:	
Fax:	Number of Years in Dairy		

Land Information

	Acres:	$/Acres:	% to Dairy	% to Other Enterprises
Building Site				
Crops				
Forages				
Pasture				
Other				

Other Enterprises (check)

____ Backgrounding

____ Poultry

____ Other (specify) _____

FARM LOANS		Owing: Jan. 1, 2002	Interest Rate	% to Dairy	% to Crops	% to Other Livestock
1	Land					
1						
2	Building					
2						
3	Livestock:					
3						
4	Machinery					
4						
5	Other:					

SUPPLIES		Value: Jan. 1, 2002	% to Dairy	% to Crops	% to Other Livestock
1	Gas, Oil & Grease				
2	Vet., Semen, Etc				
3	Bedding				
4	Dairy Livesock Supplies				
5	Rations & Supplements				
6	Other Supplies				

If you have any questions, please call Pauline Van Biert at (780) 415-2153, toll free by first dialing 310-0000

Confidential

DAIRY COST SURVEY, 2002

Machinery and Buildings as at Jan.1, 2002

Name: _____

Buildings Used for Dairy:		Purchased Price	Year Purchased	% to Dairy	% to Crops	% to Other Livestock
1						
1						
1						
1						
1						
1						
1						
1						
1						

Examples: barns, machine shed, hay sheds, bunkers, shop, calf hutches, corrals

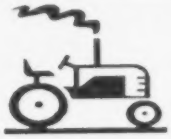
Tractors & Trucks Used for Dairy:

2						
2						
2						
2						
2						
2						
2						
2						

Dairy Equipment:

3						
3						
3						
3						
3						
3						
3						
3						
3						
3						

Examples: bulk tank, pipeline, milk meters, washer, vacuum pump, generator, buckets



SEE OVER

Other Equipment Used for Dairy:		Purchased Price	Year Purchased	% to Dairy	% to Crops	% to Other Livestock
4						
4						
4						
4						
4						
4						
4						
4						
4						
4						
4						
4						
4						
4						
4						

Examples: manure spreader, barn cleaner, manure pump, cattle trailer, quad, bale feeders, silo unloader, scraper, feed mixers, sawdust blowers, semen tank, fencers, fans, crowd gate, small tools (table saw, drill press, welder, power tools), fuel tanks, wheel barrows, computer feeding system, home computer

APPENDIX F

Alberta Fluid Milk Price Formula

2002

Alberta Fluid Milk Price Formula

Formula Pricing

Milk sold for household consumption in Alberta (Class 1a) is priced at the producer level by the Alberta Energy and Utilities Board (AEUB). Prior to 1994, the Alberta Public Utilities Board established prices at the producer, wholesale, and retail levels.

The price of fluid milk is established through a procedure known as "formula pricing", whereby an equitable price for Class 1a milk is determined through the use of selected statistical indices. In the 2002 Alberta milk pricing formula, these indicators include eight dairy production cost factors as well as one consumer demand factor. The result is an "economic formula" which incorporates supply and demand components.

Formula Development in Alberta

In 1973, the Production Economics Branch of Alberta Agriculture designed a milk pricing formula which was compared with actual milk price levels over the previous ten years. It was adopted for experimentation over a 12 month period from August, 1973 to August, 1974. Upon presentation and discussion of the results at a hearing in Red Deer in August, 1974, the Alberta Public Utilities Board ordered the formula to be used as a pricing mechanism for a test period of one year starting in October. This was to be accompanied with a cost of production program to monitor its suitability and to assess adjustments in the formula components, if required, at the end of the period.

The Alberta Fluid Milk Formula

The original Alberta fluid milk formula consisted of seven statistical factors or components (Table 1). The first five represented producers' major cost components, and therefore are a reflection of willingness to sell. The last two represent consumer demand.

Table 1

COMPONENTS OF THE ALBERTA FLUID MILK PRICING FORMULA

Old Formula		New Formula	
Index	Weight	Index	Weight
Alberta Dairy Feed Prices	14	Alberta Dairy Feed Prices	21
Alberta Hay Prices	14	Alberta Hay Prices	14
Western Cdn Farm Wage Index	12	Alberta Farm Wages	16
W. Cdn Farm Input Price Index	20	Fuel and Utilities Price Index	4
Canadian Consumer Price Index	10	Equipment Price Index	3
Alberta Industrial Wage Index	16	Building Construction Index	6
Alberta Milk Consumption	14	Bank of Canada Rate	4
		Gross Domestic Product Index	22
		W. Canada Milk Consumption	10
Total	100	Total	100

The fluid milk formula was revised on July 2, 2002. The revisions were needed because two key indices in the old formula were discontinued by Statistics Canada:

a) Western Canadian Farm Wage Index
b) Western Canadian Farm Input Price Index

The new formula has nine indices. In addition to the main supply factors of dairy feed, hay and wages, the new formula has indices representing other specific production costs (fuel and utilities, capital costs), as well as a general inflation index (gross domestic product index). The index representing demand is Western Canada per capita milk consumption.

Application

A base price of $21.04 per hectolitre for Class 1 milk was established in August, 1973. Determined from the results of the 1973 Dairy Cost Study, this provided for a return of 15 percent on sales income. The milk price formula combines the individual price indices listed in

Table 1 into a "composite" index. The composite index is essentially a weighted average of the individual price indices. This composite index was set at 100 for the base period, August 1973. With the revised formula, the new base period, also set at 100, is July, 2002. For each subsequent month, the formula then tracks the relative change of each individual price index, and the resulting change in the composite index. Next, the composite index is multiplied by the base price of $70.90, arriving at the "computed" formula milk price for the month in question.

Whenever the "computed" formula price differs by at least $0.49 per hectolitre above or below the existing Class 1 AEUB minimun producer price, the milk price formula adjusts the "suggested" milk price by $0.98 per hectolitre. This represents about a one cent per litre change in retail prices for the consumer. The Alberta Energy and Utilities Board bases its decision on setting the minimum price received by milk producers to a large extent on the milk price formula's "suggested" price.

Changes in the formula price are calculated monthly by the Economics Unit of AAFRD and are forwarded to the Alberta Energy and Utilities Board. The Alberta fluid milk formula calculations for 2002 are presented in Table 2.

TABLE 2
ALBERTA FLUID MILK PRICE FORMULA CALCULATIONS

Old Milk Pricing Formula (discontinued July 2, 2002)								PRICE FORMULA			
	<---------- cost factors ---------->					<--------- consumer factors --------->					
MONTH	ALTA DAIRY FEED $/tonne	ALTA HAY PRICE $/tonne	WEST C FARM WAGE index	WEST C FARM INPUT index	CANADA CONSUMER PRICE index	ALTA INDUSTRIAL WAGE $/week	ALTA MILK CONSUM l/month	COMPOSITE INDEX	COMPUTED PRICE $/hl	SUGGESTED PRICE $/hl	PRICE SET BY A E U B $/hl
Weight	14	14	12	20	10	16	14	100			
1986 Avg	175.15	87.10	99.08	99.32	78.06	453.02	9.07	100.00	49.96	50.01	
January-02	260.33	123.22	142.97	129.01	115.8	688.64	9.47	137.69	68.86	68.71	68.71
February	259.93	127.70	142.97	129.01	115.9	689.50	9.51	138.48	69.25	69.69	68.71
March	259.77	129.54	143.18	129.20	116.2	690.33	9.51	138.89	69.46	69.69	69.69
April	261.23	131.38	143.18	129.20	116.9	692.28	9.51	139.46	69.75	69.69	69.69
May	261.10	136.89	143.18	129.20	117.7	695.13	9.40	140.37	70.20	70.67	69.69
June	261.82	139.85	143.40	129.38	118.4	695.50	9.40	141.07	70.55	70.67	69.69

New Milk Pricing Formula (effective July 2, 2002)										PRICE FORMULA			
MONTH	ALTA DAIRY FEED $/tonne	ALTA HAY PRICE $/tonne	ALTA FARM WAGE $/month	FUEL & UTILITIES price index	MACHINE & EQUIPMENT price index	BUILDING CONSTR'N price index	INTEREST RATE %	GDP inflation index	W CANADA MILK CONSUM l/month	COMPOSITE INDEX	COMPUTED PRICE $/hl	SUGGESTED PRICE $/hl	PRICE SET BY A E U B $/hl
Weight	21	14	16	4	3	6	4	22	10	100			
New Base July-02	257.14	142.80	1977.36	1.53	99.5	114.7	4.65	105.6	7.82	100.00	70.90	71.07	70.67
August	261.75	144.33	1960.10	1.57	99.5	114.7	4.64	105.6	7.58	100.16	71.02	71.07	70.67
September	283.55	152.08	1968.19	1.55	99.0	115.6	4.63	107.4	7.58	103.12	73.11	73.03	70.67
October	287.71	153.61	1971.76	1.55	99.0	115.6	4.63	107.4	7.58	103.63	73.47	73.03	71.07
November	289.69	153.61	1949.85	1.57	99.0	115.6	4.62	107.4	7.47	103.52	73.40	73.03	73.03
December	289.60	154.73	2003.27	1.67	98.7	116.3	4.60	108.0	7.47	104.48	74.08	74.01	73.03